# ATS-PLC *Ver1.0*

## *PROGRAMMABLE TOUCH-SCREEN*
## *AUTOMATIC TRANSFER SWITCH*
### *CONTROL UNIT*
### *OPERATOR'S MANUAL*

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# SECTION 1 : INTRODUCTION

## 1.1 Preliminary Comments and Safety Precautions

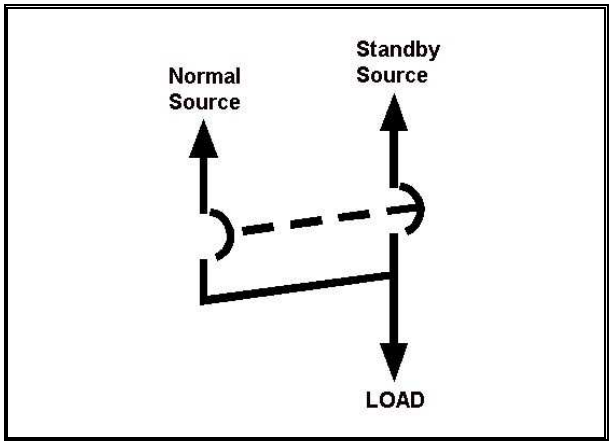
The manual covers installation, operation and maintenance of the ATS-PLC Automatic Transfer Switch Controller. This manual is for use by authorized and qualified personnel only.

**WARNING**

**High voltages can kill.**

## 1.2 Overview

Transfer switches protect critical electrical loads against loss of power. A standby (emergency) generator backs up the normal grid power. The transfer switch connects either the normal or the standby supply to the load. When power is lost from the grid, the transfer switch transfers the load to the standby source. Eventually after the grid is restoration, the ATS connects the load back to the grid.




## 1.3 Product Overview

The ATS-PLC is a programmable multifunction touch-screen automatic transfer switch control unit with built in 5.7” inch color touch screen. The compact design easily replaces the general conventional ATS controlling circuit board and controllers. The interface is user friendly with plenty of preferred settings and configuration to suit user preference. Suited for single phase/3 phase 3 wires/ 3 phase 4 wires systems.

The multi parameter setting ranges enables the controller to operate on all kinds of ATS transfer Switches and the customizable features to fulfill the operator’s needs. All configurations are stored in the internal program memory to prevent loss of data or important settings during a power outage.

## 1.4 Functions / Features

- Microcomputer program control, compact size and easy installation.
- 5.7” inch color LCD touch-screen.
- Program and function setting via touch-screen operation.
- Voltage, current, frequency and KVA readings for normal and standby power and current time display.
- Voltage, current and frequency readings displayed digitally in numeric or gauge type display.
- Normal and standby power full phase voltage monitoring and protection.
- Normal and standby power frequency monitoring and protection.
- Normal and standby reverse phase sequence protection.
- Normal and standby overload or short circuit trip monitoring and protection.
- Optional exercise with or without load.
- Optional 1 to 4 weeks automatic scheduled exercise / testing.
- Pre-alert warning signal output for scheduled automatic Exercise / testing.
- Transfer failure alarm.
- Full compatibility with all types of ATS switches.
- Optional USB / RS485 / Ethernet remote (mobile proxy) communication functions.
- Program on-site or from remote (mobile) device (PC, Smart Phone).
- Program on-site or from remote (mobile) device (PC, Smart Phone).
- Permanent stored configuration, prevent loss of data during power outage.
- Front panel display provides source status and fail alarm indications.
- Built-in 40 sets of event log.
- Built-in 4 digits password protection.
- Multiple language support (Traditional Chinese / English / Spanish).

## 1.5 Electrical Characteristics

### System Power

| ITEM | CONTENT | FACTORY PRESET |
|---|---|---|
| System Phase | 3 Phase 4 Wires / 3 Phase 3 Wires / Single Phase | 3 Phase 3 Wires |
| Current Transformer (CT) | X/5A (X = Primary Current, 5A = Secondary Ratio)<br>X = Not Available/50/100/150/200/250/300/400/500/600/800/1000/1200/1500/1600/2000/3000/4000/5000/6000 (A) | 1000/5A |

### Time Delay Setting

| ITEM | SETTING RANGE | UNIT | FACTORY PRESET |
|---|---|---|---|
| Time Delay Emergency to Normal (TDEN) | 0 ~ 1800 sec | 2 sec/unit | 10 sec |
| Time Delay Normal to Emergency (TDNE) | 0 ~ 1800 sec | 2 sec/unit | 10 sec |
| Timer Delay Engine Start (TDES) | 0 ~ 300 sec | 2 sec/unit | 10 sec |
| Timer Delay Engine Cooling (TDEC) | 0 ~ 1800 sec | 2 sec/unit | 30 sec |
| Time Delay OFF position (TDOF) | 0 ~ 300 sec | 2 sec/unit | 4 sec |

### Protection Setting

| ITEM | SETTING RANGE | UNIT | FACTORY PRESET |
|---|---|---|---|
| Normal/ standby Over Voltage Protection | 110V ~ 530V | 10V/unit | 250V |
| Over Voltage Reset Value | -20V ~ 0V | 1V/unit | -5V |
| Normal/ standby Under Voltage Protection | 80V ~ 470V | 10V/unit | 180V |
| Under Voltage Reset Value | 0V ~ 20V | 1V/unit | 5V |
| Normal/ standby Over Frequency Protection | 51Hz ~ 75Hz | 1Hz/unit | 65Hz |
| Over Frequency Reset Value | -10Hz ~ 0Hz | 1Hz/unit | -1Hz |
| Normal/ standby Under Frequency Protection | 40Hz ~ 59Hz | 1Hz/unit | 55Hz |
| Under Frequency Reset Value | 0Hz ~ 10Hz | 1Hz/unit | 1Hz |
| Abnormality Confirmation Time Delay | 0 ~ 99 sec | 1 sec/unit | 10 sec |
| Reverse Phase Sequence Protection | Enabled / Disabled | | Disabled |

### Brightness Adjustment

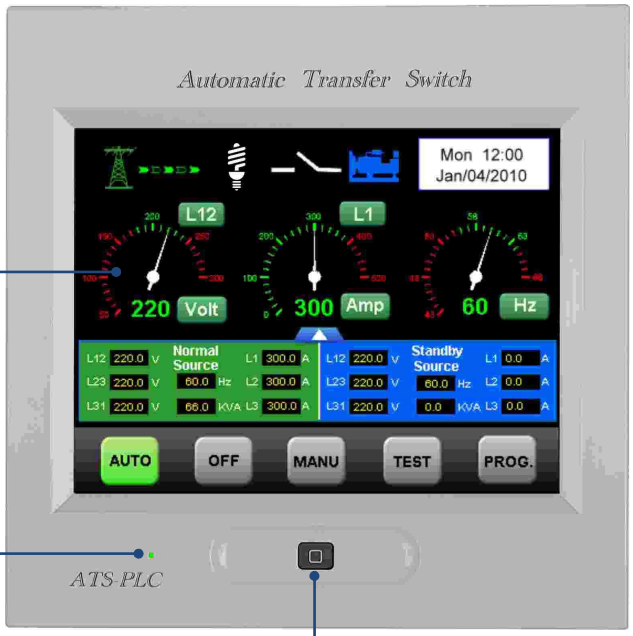
| ITEM | SETTING RANGE | UNIT | FACTORY PRESET |
|---|---|---|---|
| Brightness Adjustment | Level 1 ~ Level 8 | 1 level | Level 6 |
| Screen Saver | 2 min ~ 10 min or cancelled | 1 minutes | 3 min |

### Communications Transmission

| ITEM | SETTING RANGE | FACTORY PRESET |
|---|---|---|
| Remote Operation | Enable/Disable | Disable |
| Baudrate | 1200 / 2400 / 9600 / 19200 / 38400 / 57600 | 38400 |
| RS485 Slave Address | 00 ~ 99 (Valid value 01 ~ 99；00 Disabled) | 00 (Disabled) |

## 1.6 Exterior Overview

### Front



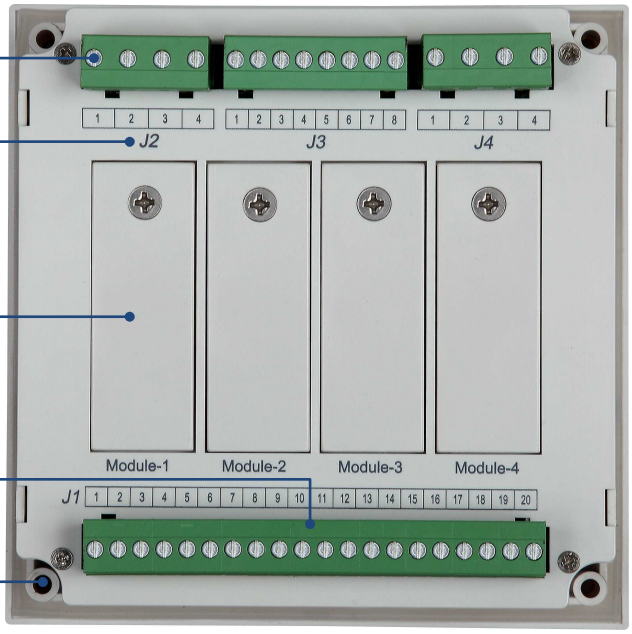

Color Touch-Screen

Power on Indicator LED (Blinking)

Home Button

Press to return to main page at anytime
Press and hold for 10 sec to execute touch screen sensitivity adjustment function

### Rear




Removable DIN terminals

Terminal Number

Communication Expansion Sockets

Removable DIN terminal

Mounting Hole

## 1.7 ATS-PLC Quickly Start

Step1：Refer to chapter-5 (wiring diagram) for completed wiring.

Step2：Turn on the DC power and set the ATS-PLC controller under OFF mode.

Step3：Into programming mode.

Step4：Setting current time. (Refer to 2.7.3.1)

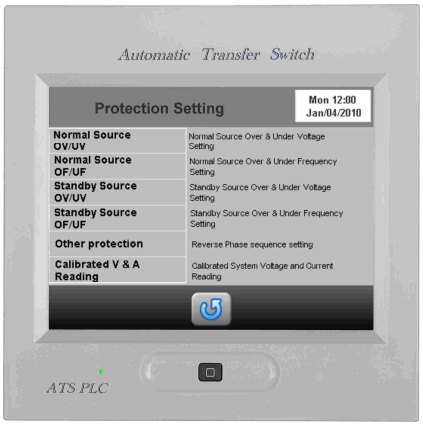
Step5：Select Language. (Refer to 2.7.3.2)

Step6：Setting system phase and CT rated. (Refer to 2.7.5.1)

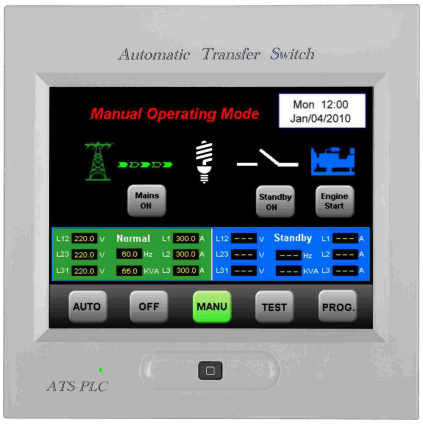
Step7：Select switch type. (Refer to 2.7.5.3)

Step8：Setting exerciser parameter if needed. (Refer to 2.7.5.4)

Step9：Setting all the necessary protections for both Normal and Standby source. (Refer to 2.7.5.5)

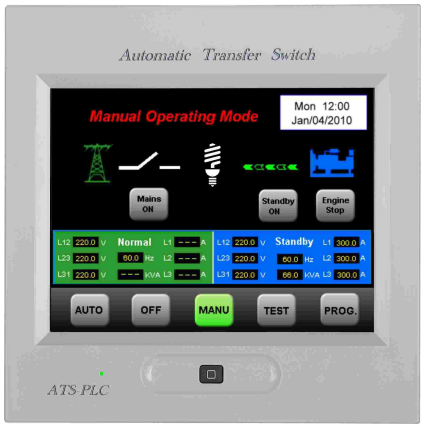



Step10：Power on Normal side AC volt input and set the ATS-PLC under Manual mode.




Step11：Operate testing.

Manually start the genset and transfer the load from Normal to Standby source by press touch key.




Step12：Manually transfer the load go back to Normal Source and stop the genset by press touch key.

Step13：Repeat Step 11 & 12 to make sure the ATS works or not.

Step14：Set the ATS-PLC on AUTO mode and finished the quick start procedure.

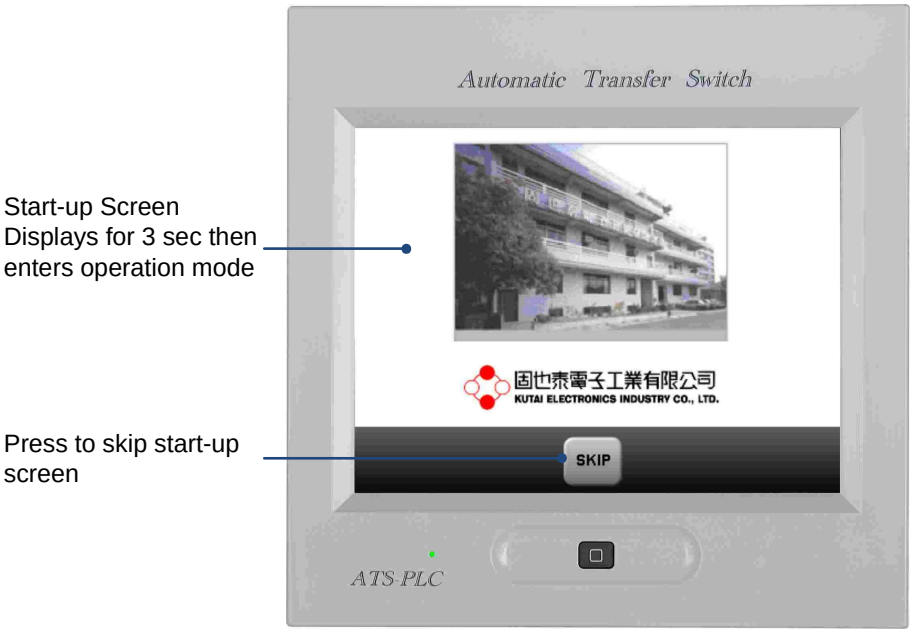
# SECTOIN 2 : TOUCH SCREEN PANEL OVERVIEW

## 2.1 Status Icons

| Icon | Function |
|---|---|
| | Normal power / Grid |
| | Emergency power / Standby |
| | Load |
|  | Power source connected |
|  | Power source not connected |
| | Connecting failure |
| | Overload or trip warning |
| | Reverse phase sequence warning |
| | ATS failure |
| | Incorrect operation |
| | Incorrect password entered. System locked (Please contact with dealer) |

| Icon | Function |
|---|---|
| | Engine remote start |
| | TDEN/TDNE/TDEC/TDES<br>Time delay countdown |
| | Return to last page (Modification will not be saved if pressed in setting mode) |
| | Enter / Save |
| | Increase |
| | Decrease |
| | Move right |
| | Move left |
| | Event logs erase |
| | Mute |

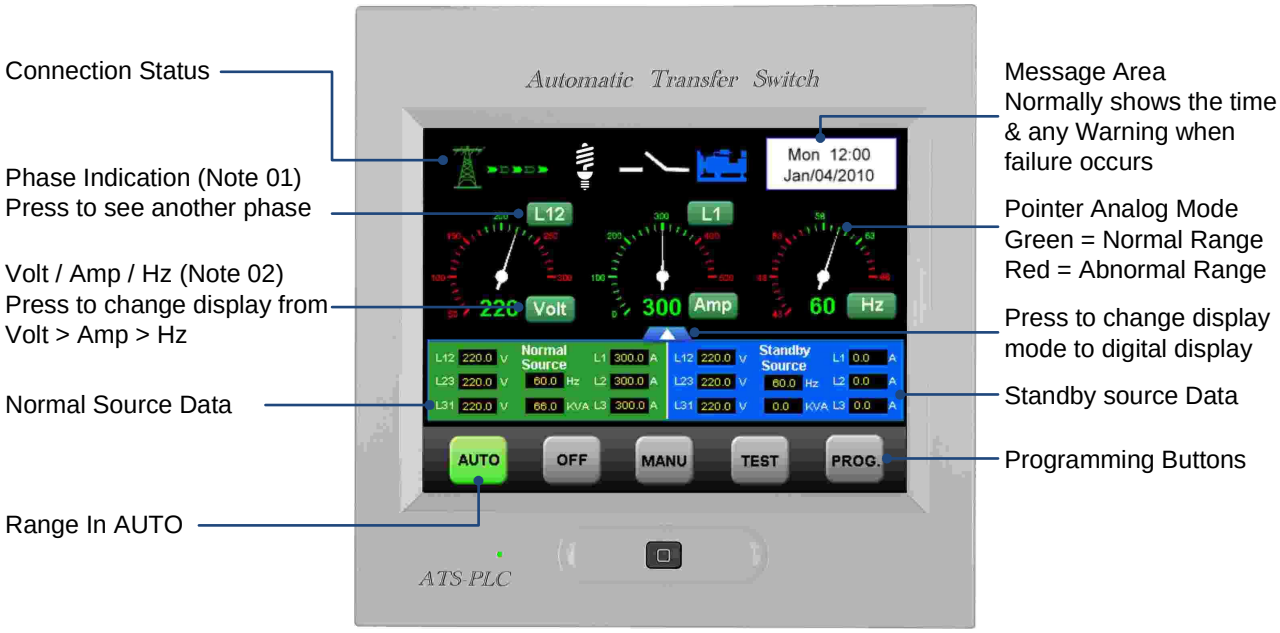
## 2.2 Start-up Screen




Attention! Start-up screen is customizable by user, for details please refer to APPENDIX 02.

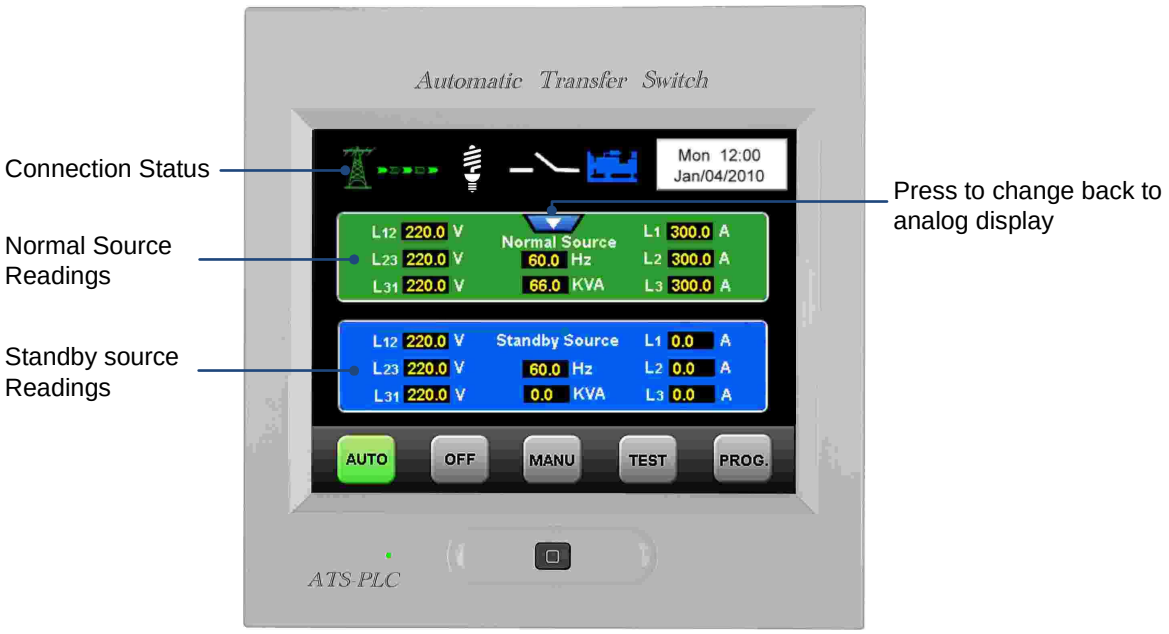
## 2.3 Auto Mode

### 2.3.1 Pointer Gauge Meter Mode Main Screen



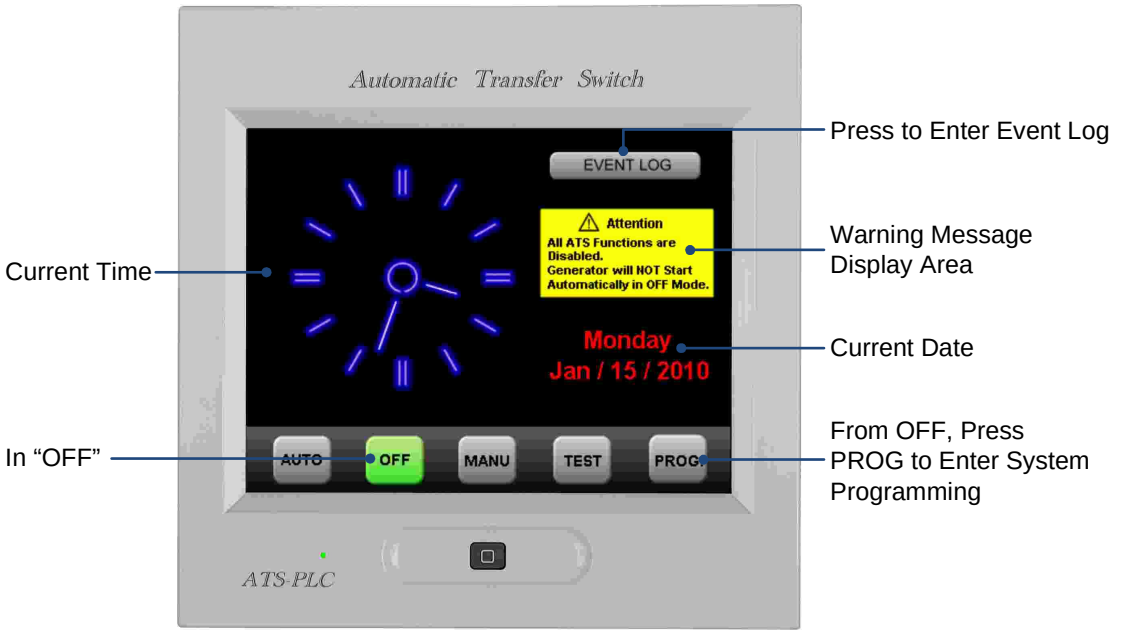

【Note 01】3 Phase 3 Wires selection sequence = L12 > L23 > L31.
3 Phase 4 Wires selection sequence = L12 > L23 > L31 > L1N > L2N > L3N
【Note 02】Volt / Amp / Frequency display sequence = Volt > Amp > Hz

### 2.3.2 Numerical Meter Mode Main Screen

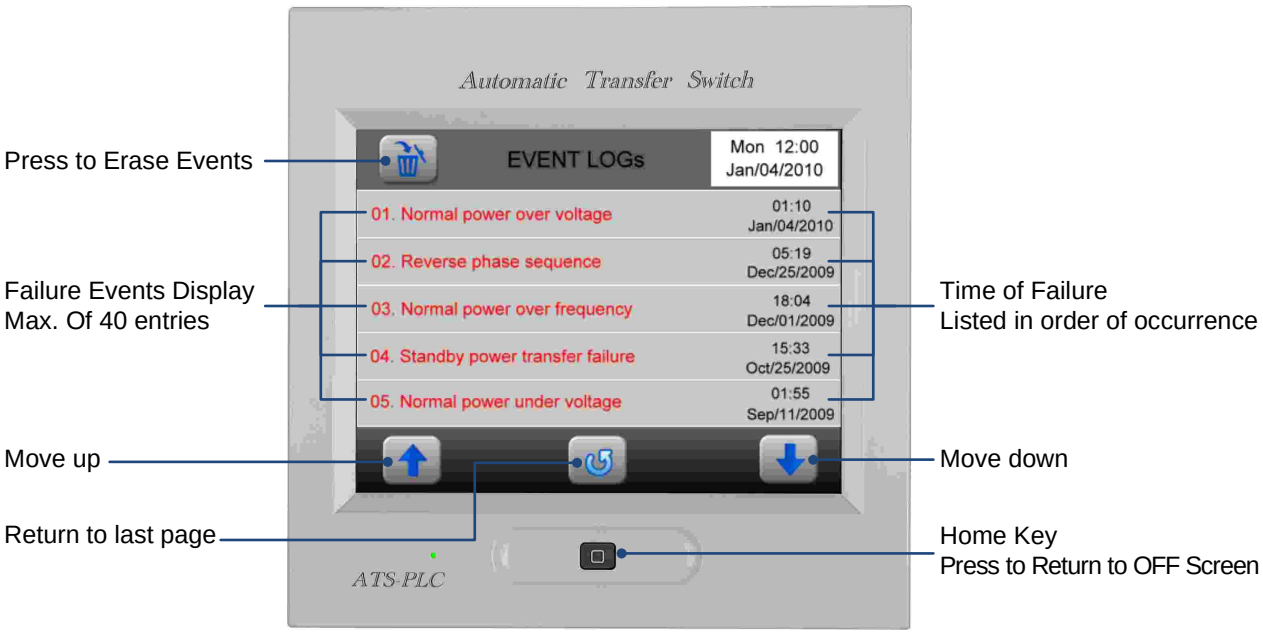


## 2.4 OFF Mode

### 2.4.1 OFF Mode Display Screen



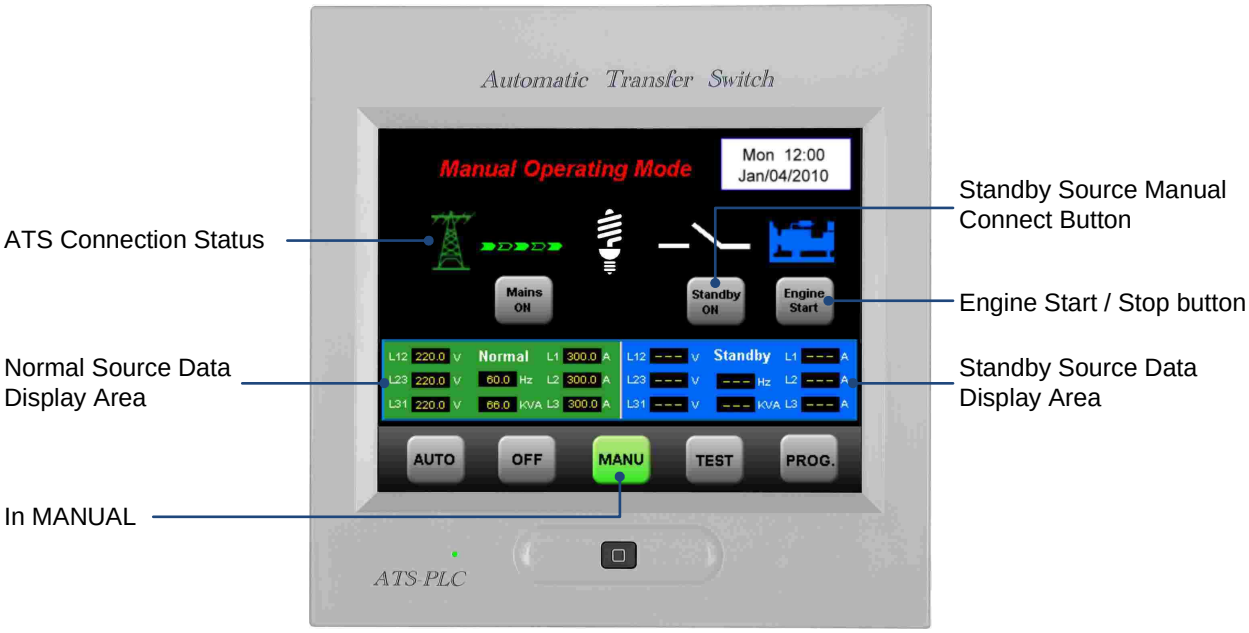

### 2.4.2 Event Log Display Screen



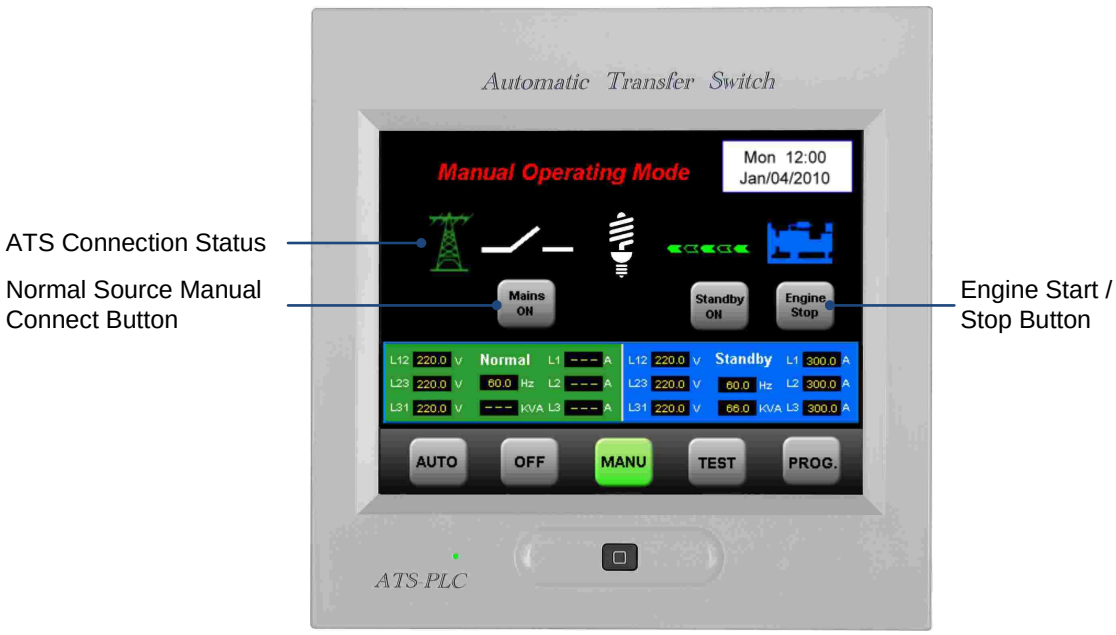

Attention! If controller left untouched or no entries being selected in 60 seconds the screen will automatically return to OFF screen.

## 2.5 Manual Mode

### 2.5.1 Manual Mode Display Screen (Normal Source Supplying)

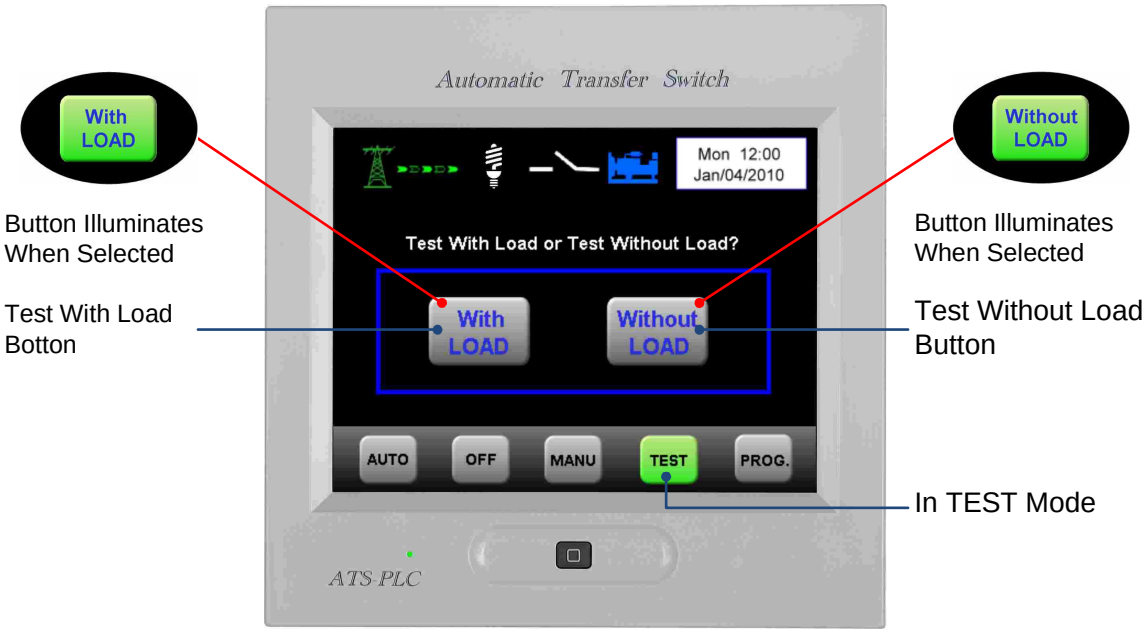



### 2.5.2 Manual Mode Display Screen (Standby Source Supplying)



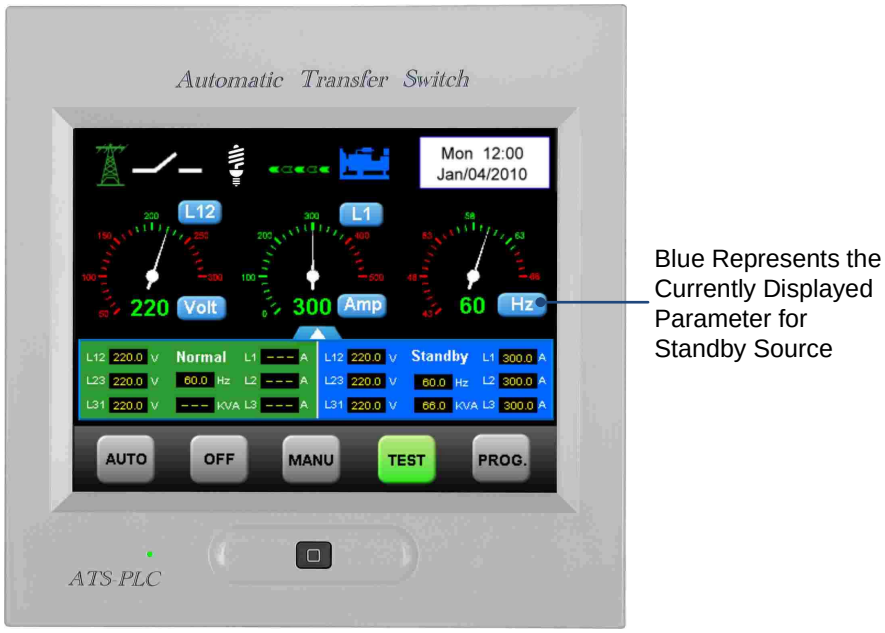
## 2.6 TEST Mode

### 2.6.1 With Load / Without Load Selection




Attention! When executing Test while emergency source is connected, system will bypass " With Load / Without Load Selection " and exercise testing with load.

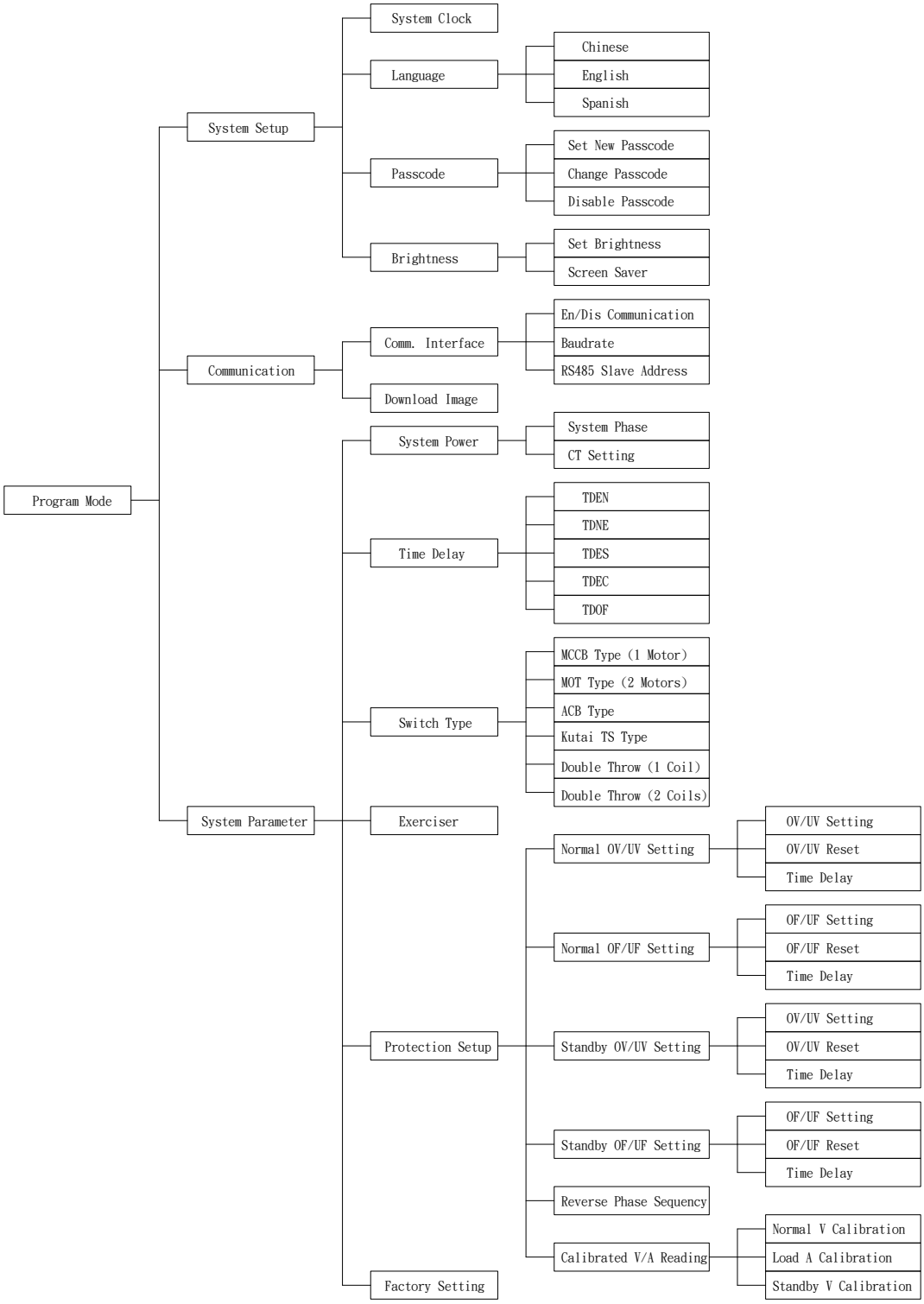
### 2.6.2 With Load Testing Screen Display



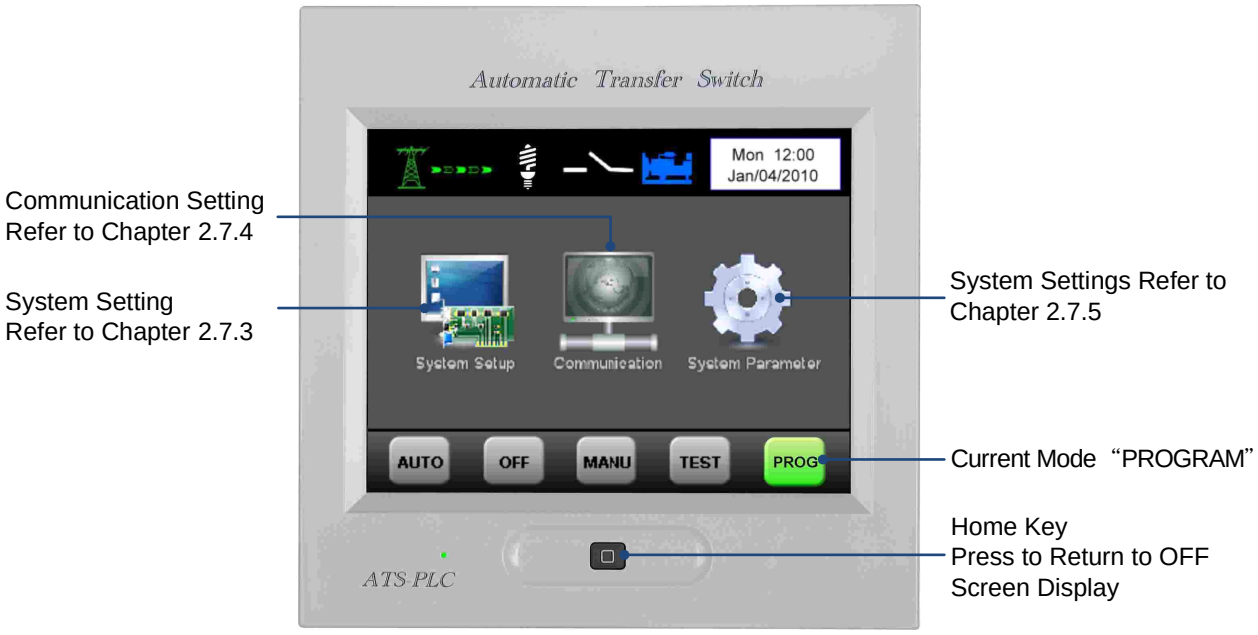
## 2.7 Program Mode (PROG)

Attention! Prior to execute system parameter configuration / Programming (PROG), first set system to OFF Mode then press PROG to enter program configuration, otherwise a operation failure message will be displayed. (See illustration in 2.7.2 MANU Mode Procedure Error Warning).

### Programming Map

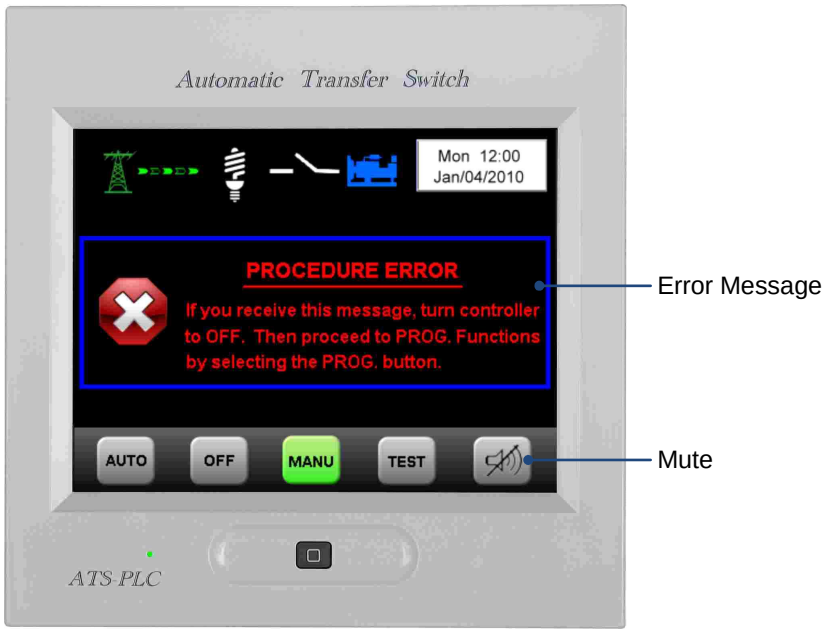


### 2.7.1 Program Mode Display Screen



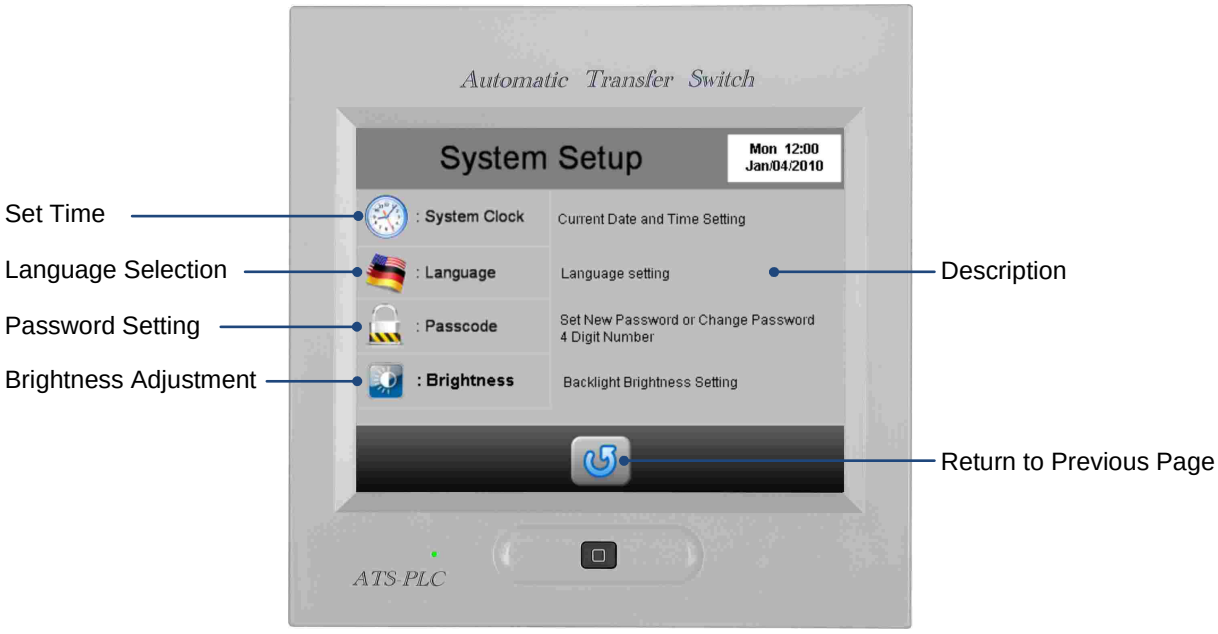

Attention! If controller left untouched or no entries being selected in 60 seconds the screen will automatically return to OFF mode display screen.

### 2.7.2 Enter Program Mode Procedure Error Warning

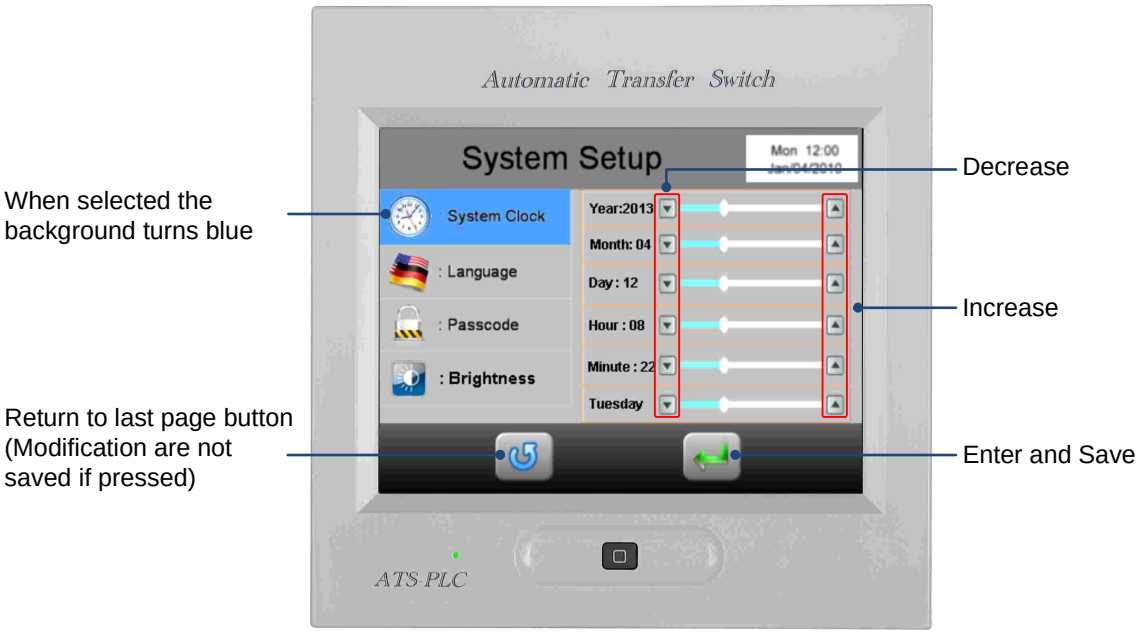



Attention! The error message is displayed for 5 seconds only, and then automatically returns to previous screen.

### 2.7.3 System Setup




#### 2.7.3.1 System Clock Setting

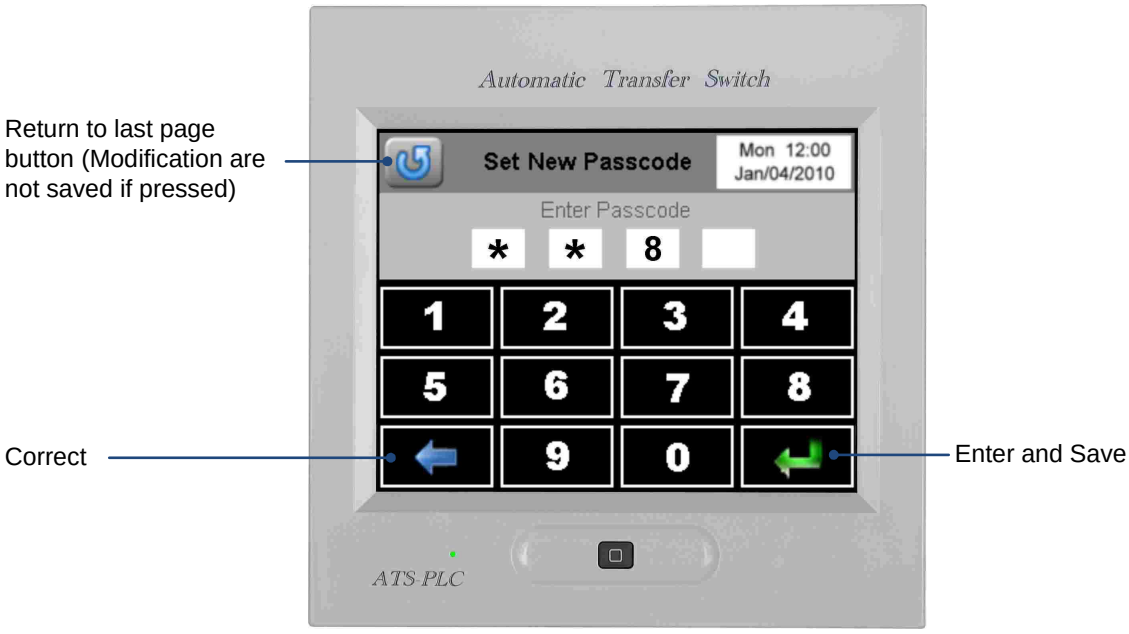



Attention! The adjustment of system clock directly affects the automatic exerciser test and event log records, therefore it is vital to setup the correct current time and date when install the unit for the first time.

### 2.7.3.2 Language Setting

Currently ATS-PLC operating language only support traditional English and Spanish.

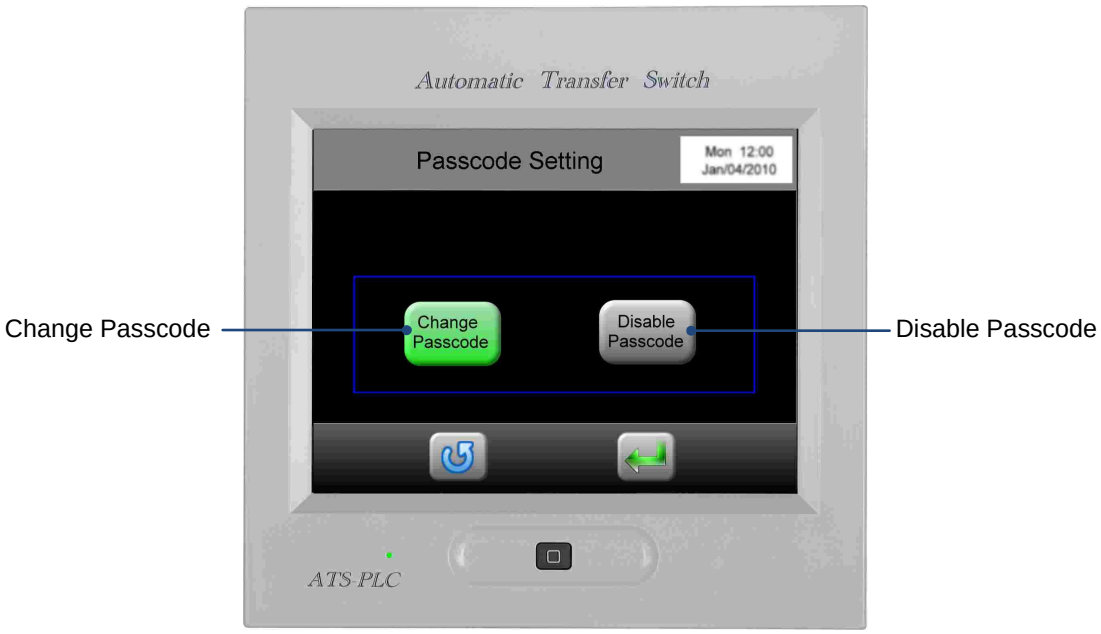
### 2.7.3.3 Passcode Setting



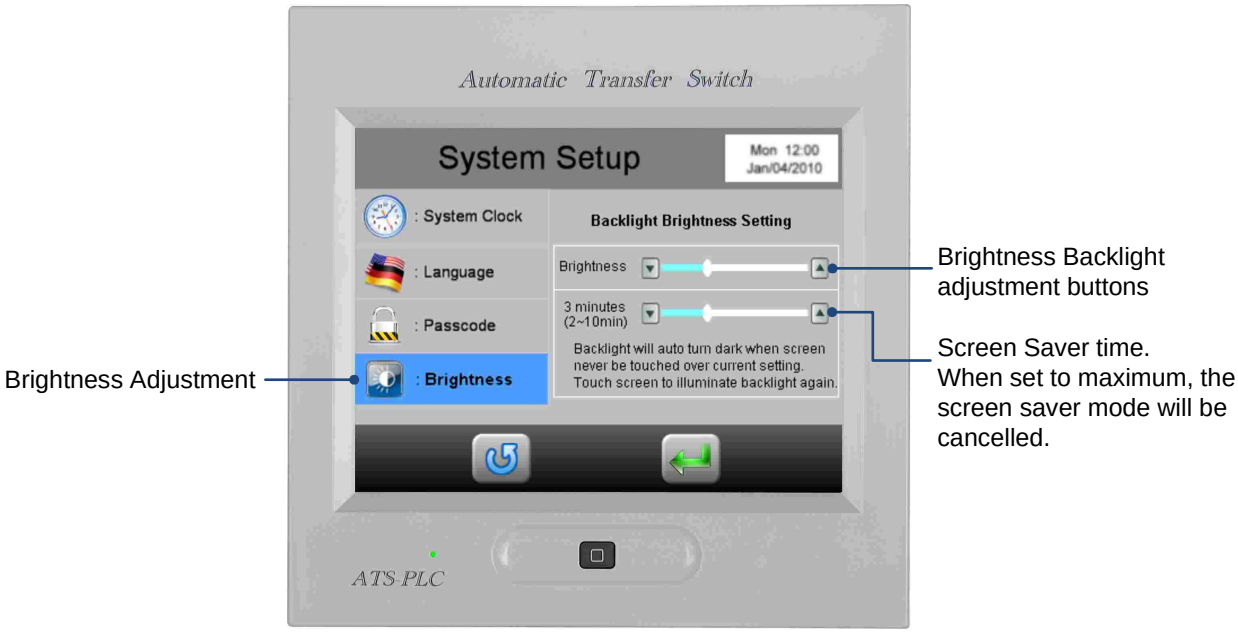

Attention! The Passcode protects only the authority to change or adjust the parameter setting, will not affect the operation of the controller's functions.

### 2.7.3.4 Change or Disable Passcode

Once passcode is set, to change or disable the passcode, enter “System Setup” and click “Passcode”.

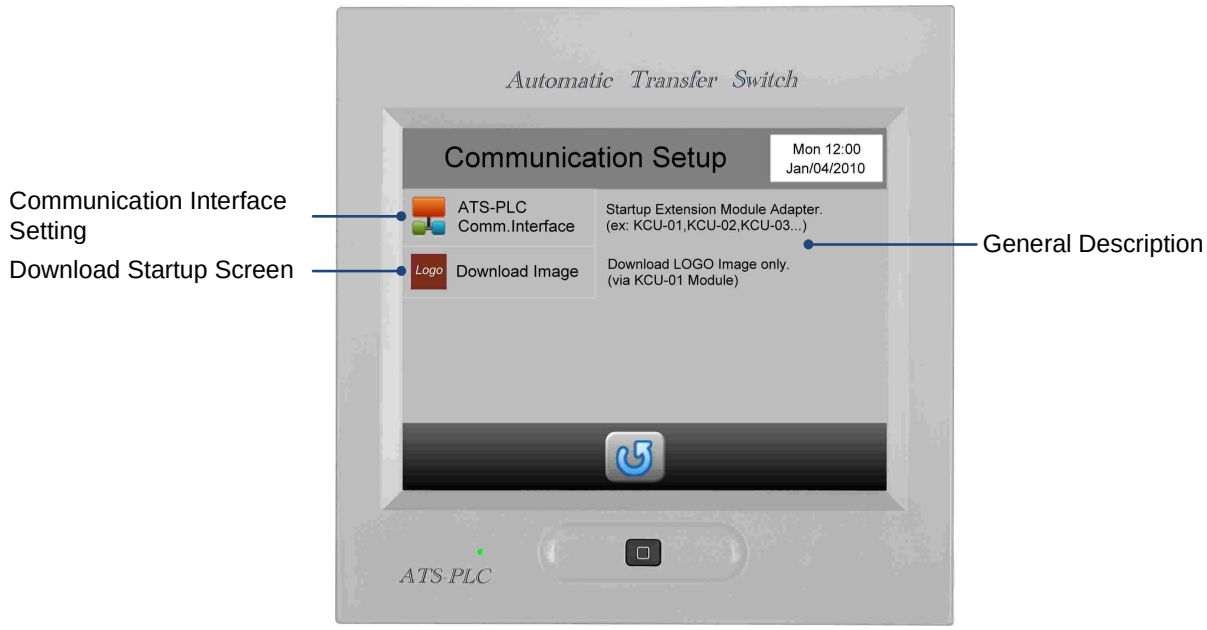



### 2.7.3.5 Brightness Adjustment



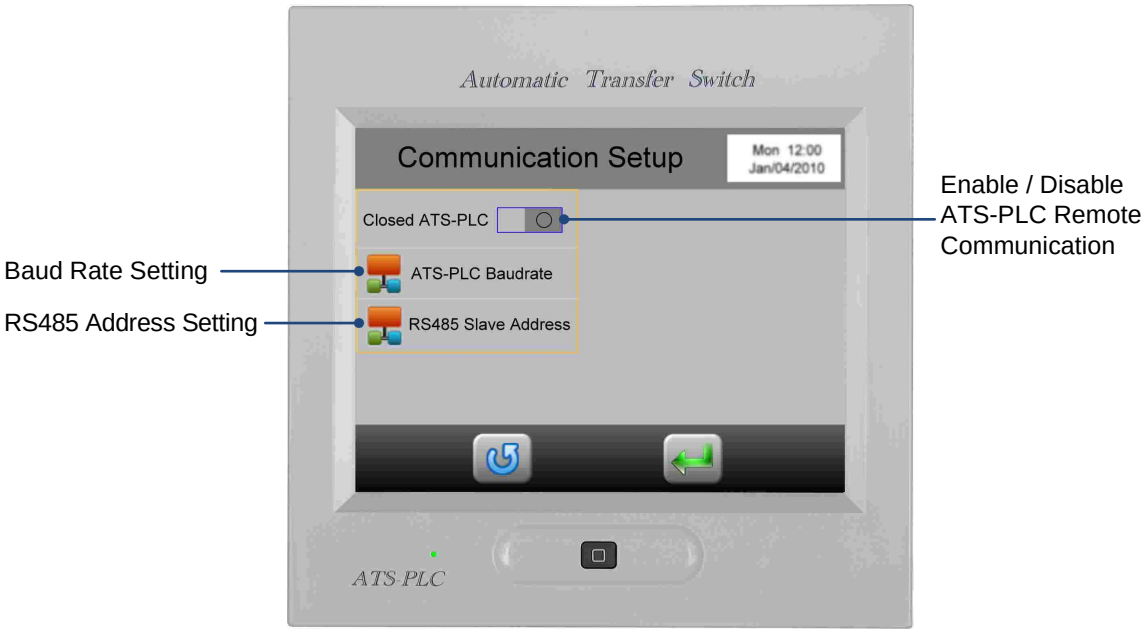
### 2.7.4 Communication Setup

In this setting, user can choose to run the remote communication interface settings and download personalization of the startup screen function.

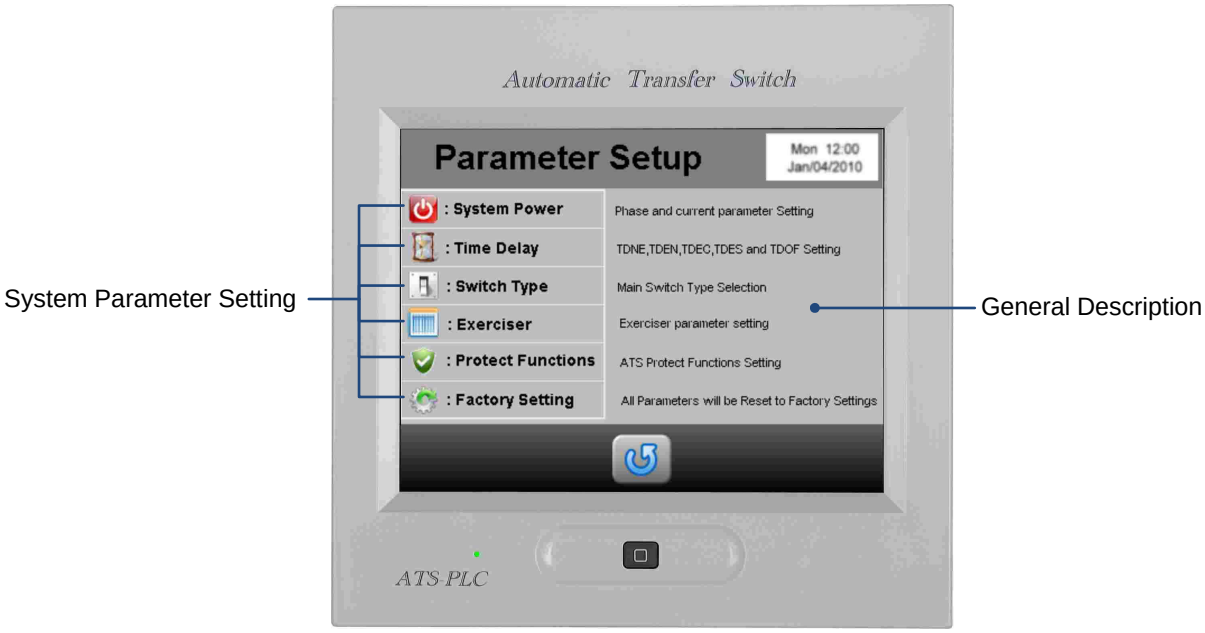



Attention! For Startup Screen download program, please refer to Appendix 02.

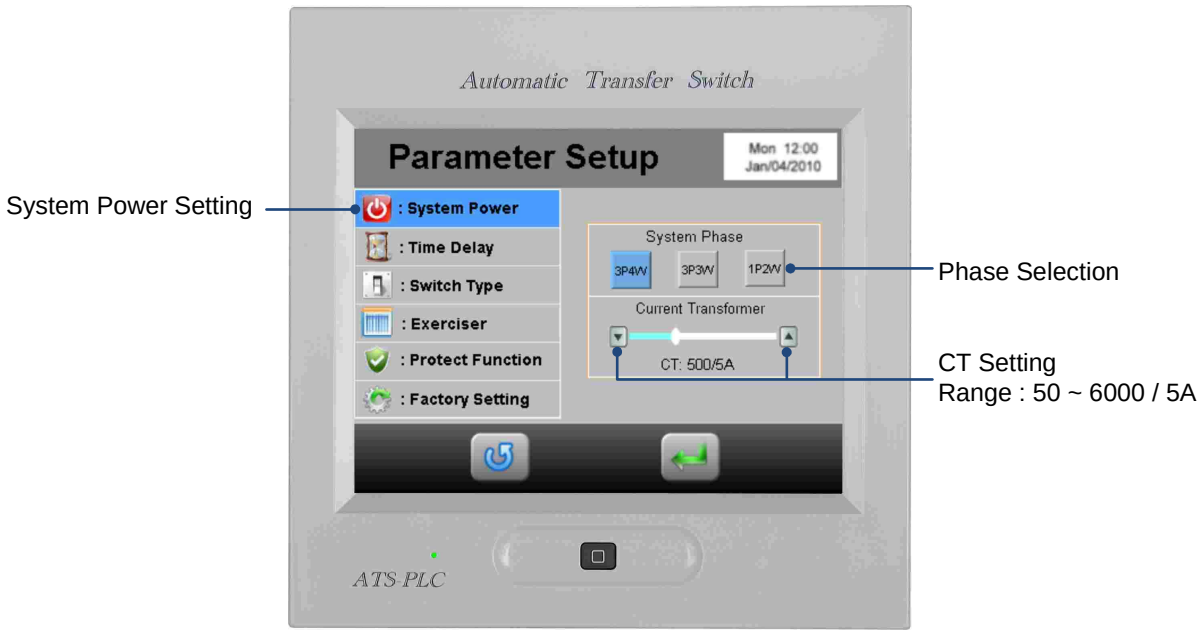
#### 2.7.4.1 Remote Communication Interface Setting



## 2.7.5 System Parameter Setting




### 2.7.5.1 System Power Setting



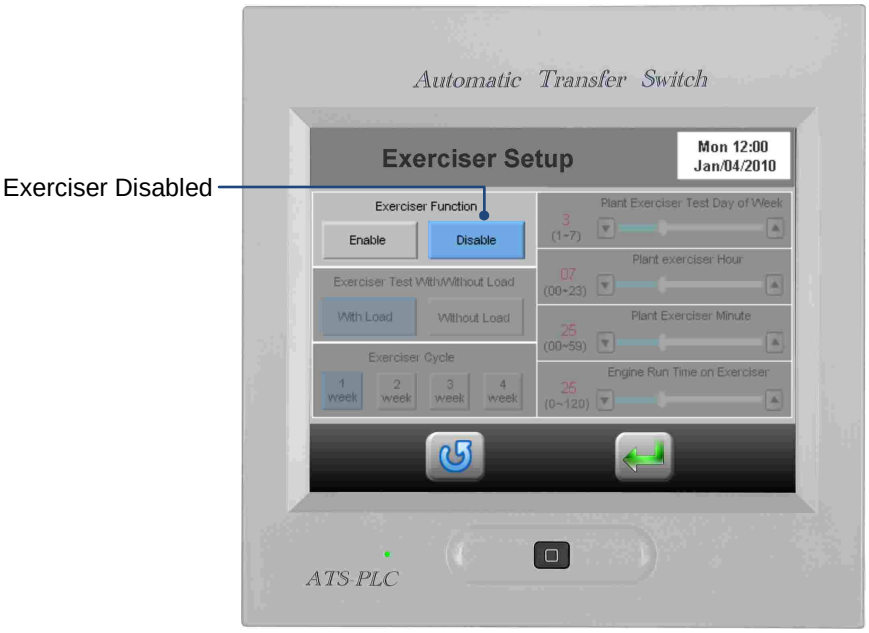
### 2.7.5.2 Time Delay Setting

Attention! All time delay setting is 2 seconds per Unit.

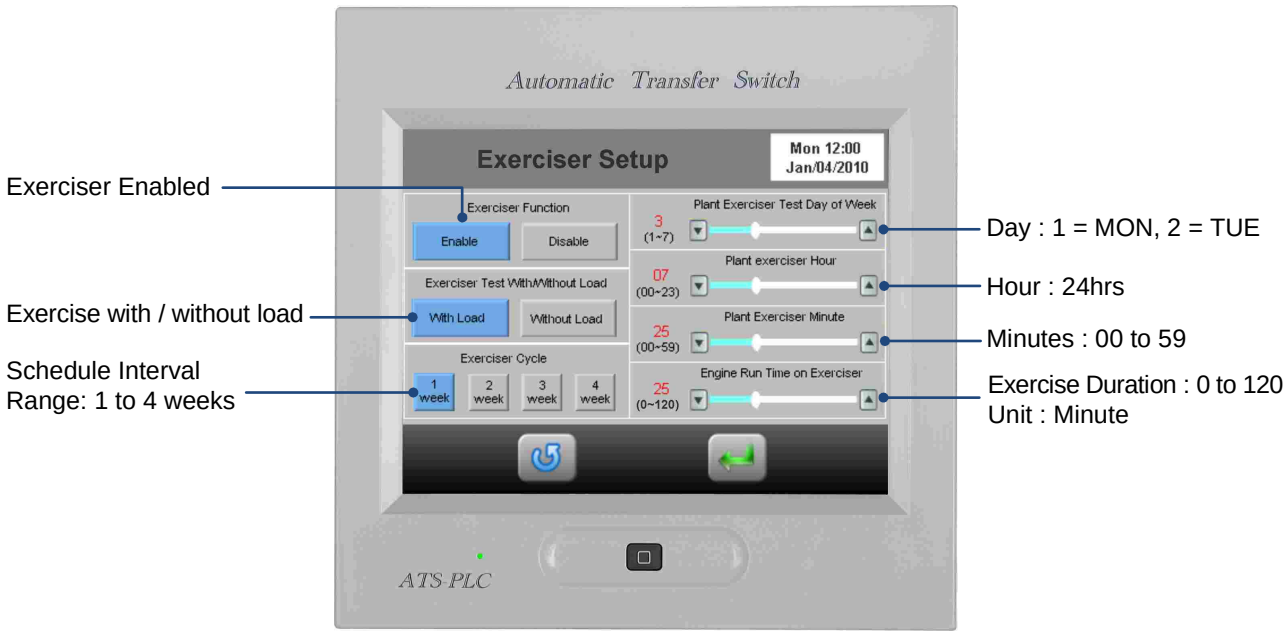
### 2.7.5.3 Transfer Switch Type Setting

Attention! When inconsistent transfer Switch is selected, may cause the ATS fails to operate.

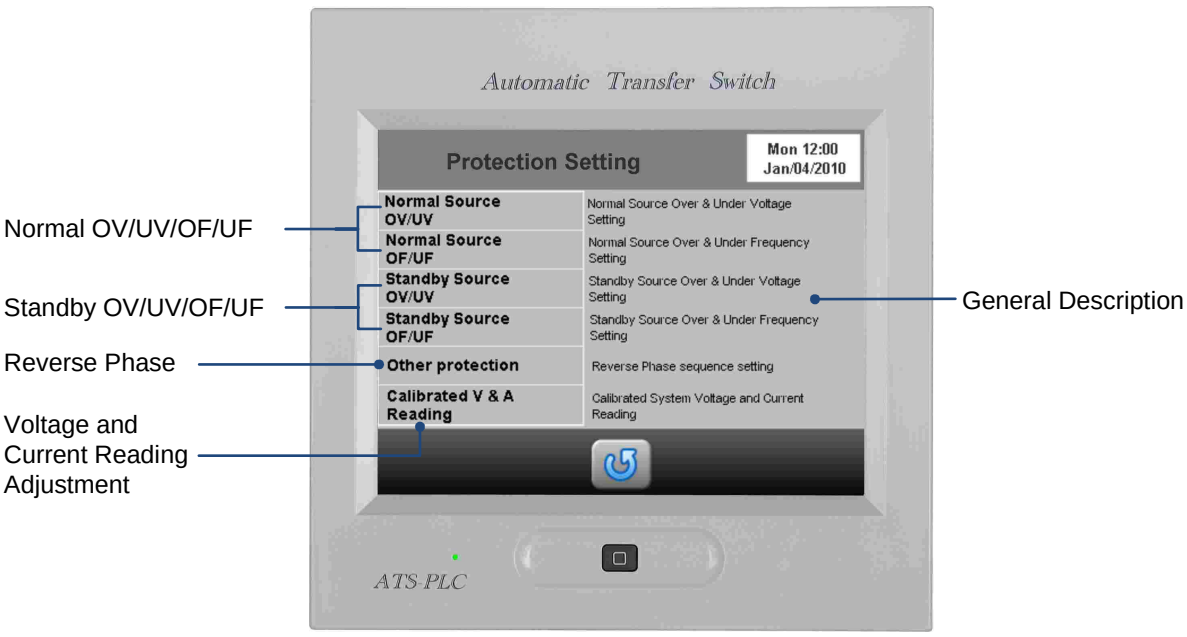
### 2.7.5.4 Scheduled Automatic Testing / Exerciser Setting



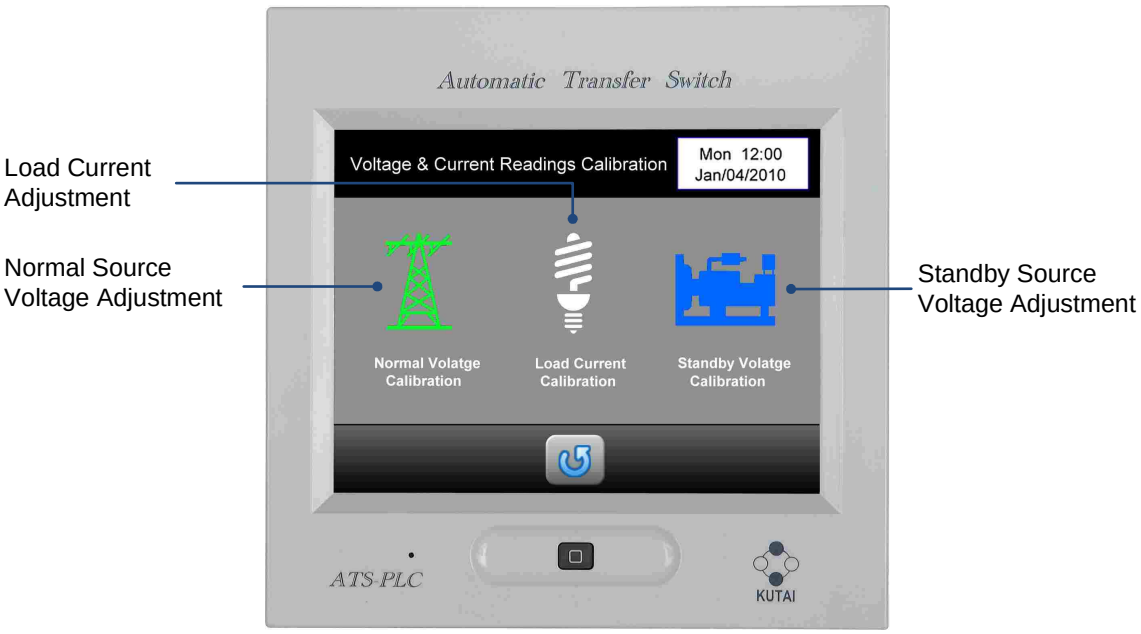

Attention! When Exerciser is disabled, All corresponding adjustments are omitted.



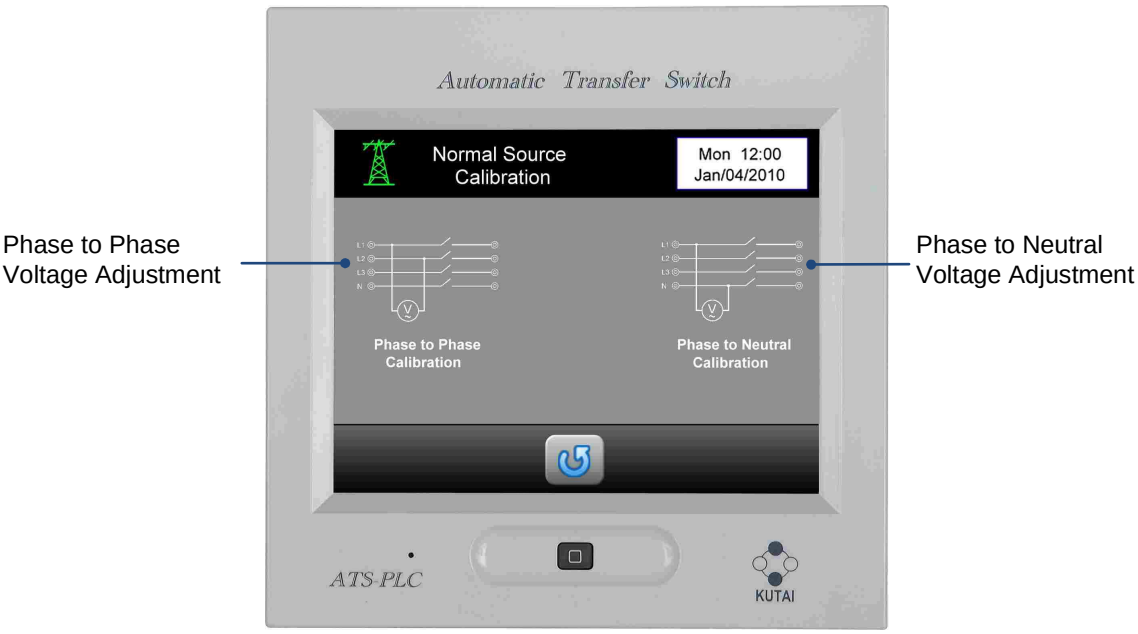
### 2.7.5.5 Voltage, Frequency Protection and Voltage and Current Reading Adjustment




**Voltage and Current Adjustment**



**Normal Source Voltage Adjustment**




Attention! This screen is displayed in 3 Phase 4 Wire system voltage setting only.

### 2.7.5.6 Reset to Factory Setting / Default

Attention! When execute factory reset, all modified system parameters will be override to factory preset / default setting.

## SECTION 3 : KCU-XX COMMUNICATION MODULE SETTING

By installing the KCU-XX modules (EX：KCU-01, KCU-02, KCU-03.... etc.) to the ATS-PLC, user can operate or monitor the generator remotely.

- KCU-01 – USB communication module
- KCU-02 – RS-485 communications module
- KCU-03 – Ethernet communications module

**WARNING**

**A remote start signal can activate the ATS-PLC and the engines can start at anytime without warning. Place a "Danger" warning sign next to the generator, stating that this generator can start at anytime!" also install a warning buzzer or a flash light. Unexpected engine starts can result in serious injury or death. When performing service or maintenance, always disconnect he remote start signal input.**

**WARNING**

**When servicing or operating near the vicinity of the generator, Always make sure the remote communication setting is turned off, to ensure the safety of the servicing personnel nearby.**

If the KCU-03 Ethernet module installed on the ATS-PLC you can remotely monitor and operate the ATS and generator using the IPhone and Android mobile phones. Free App software is available for Apple iOS5.1 system or above and android operating system 2.3.3 or above. Free software can be downloaded from App Store or Google Play by simply key in "Kutai" and hit search.

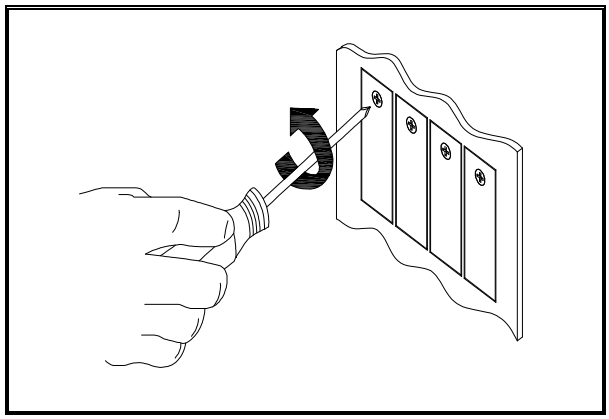
For corresponding remote communication settings please refer to Section 2.7.4.1 and KCU-XX user manuals and software user manuals.

**WARNING**

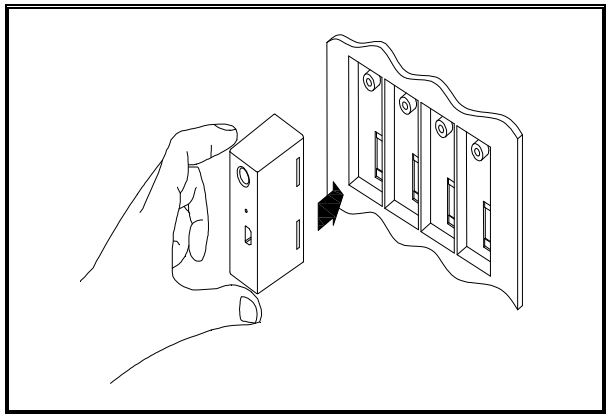
**ATS-PLC with KCU-02 module constitutes a closed LAN network. Each controller address can be set from 1 to 99 and not to be repeated. Same transmission rate is a must !!**

The installation for the KCU-XX communication module on the ATS-PLC controller is fairly simple.

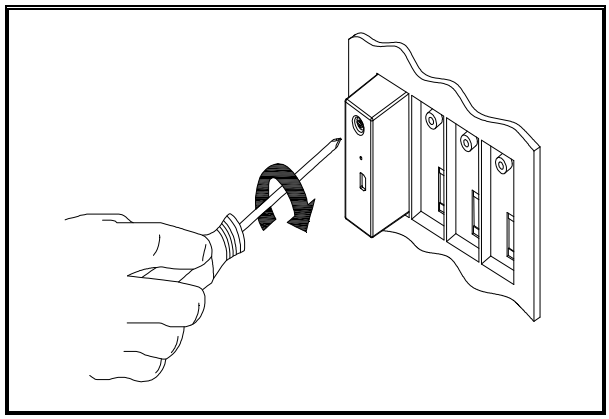
Step 1：Remove slot cover from the back of controller.

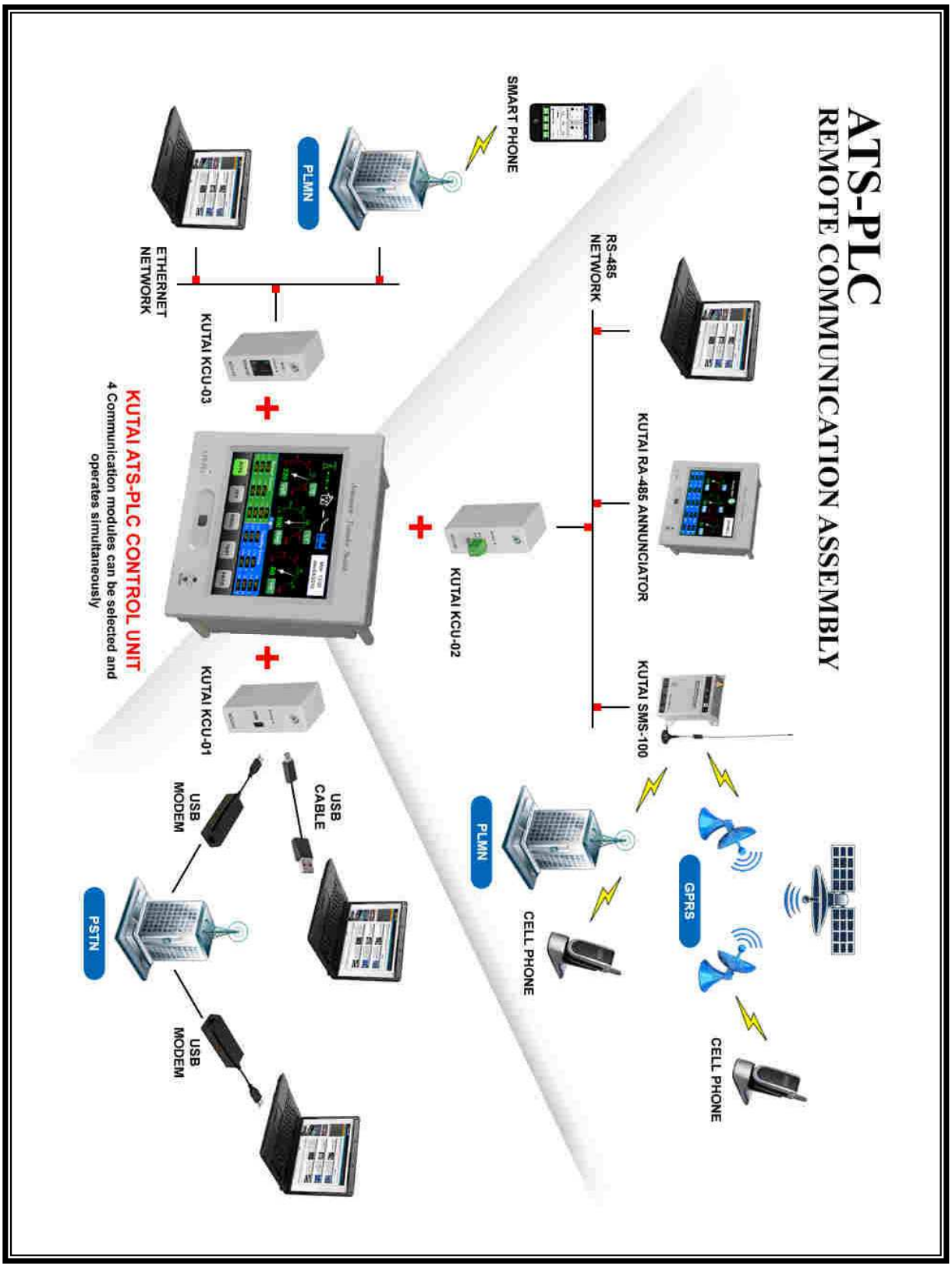


Step 2：Insert KCU-XX into the ATS-PLC communication slot.



Step 3：Tighten the screw.



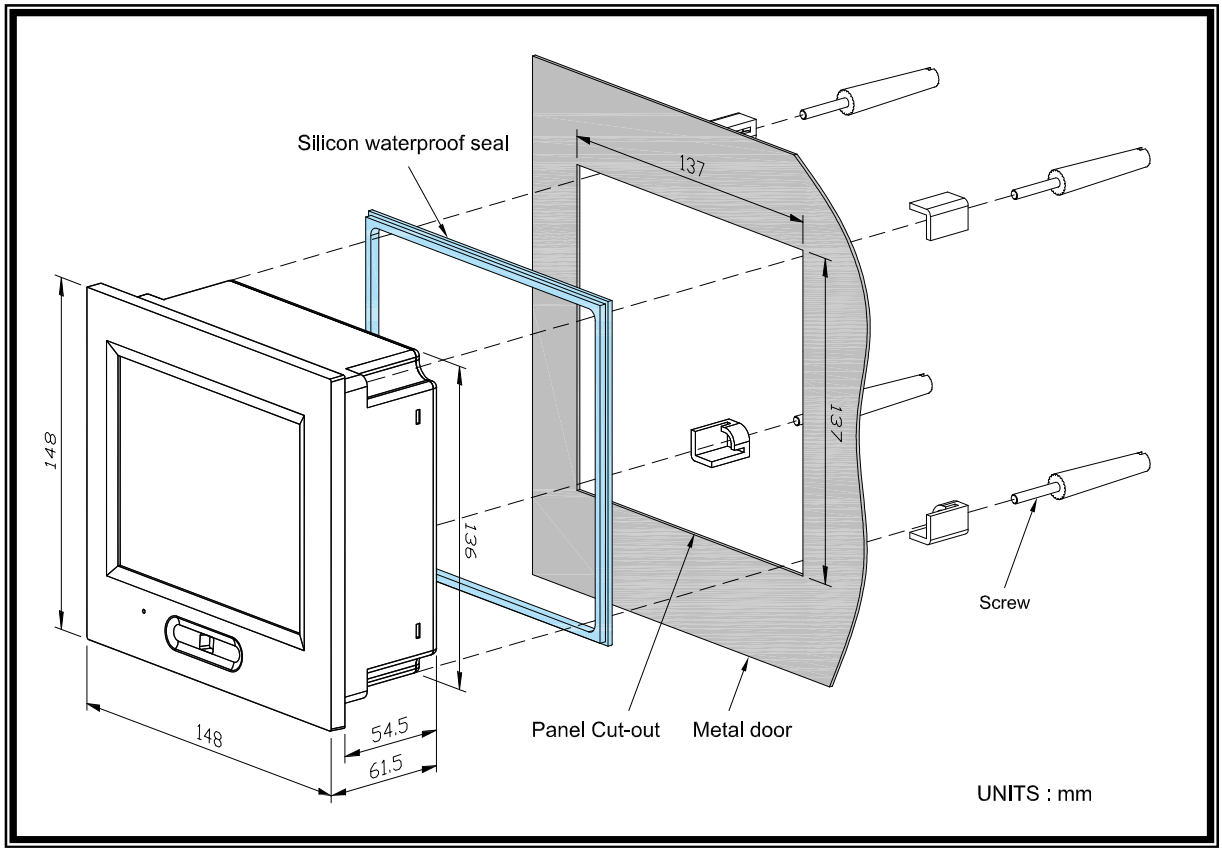

ATS-PLC
REMOTE COMMUNICATION ASSEMBLY
SMART PHONE
PLMN
ETHERNET NETWORK
KUTAI KCU-03
KUTAI ATS-PLC CONTROL UNIT
4 Communication modules can be selected and operates simultaneously
KUTAI KCU-01
USB MODEM
USB CABLE
PSTN
USB MODEM
RS-485 NETWORK
KUTAI RA-485 ANNUNCIATOR
KUTAI KCU-02
KUTAI SMS-100
PLMN
CELL PHONE
GPRS
CELL PHONE

# SECTOIN 4 : SPECIFICATION AND INSTALLATION

## 4.1 General Specification

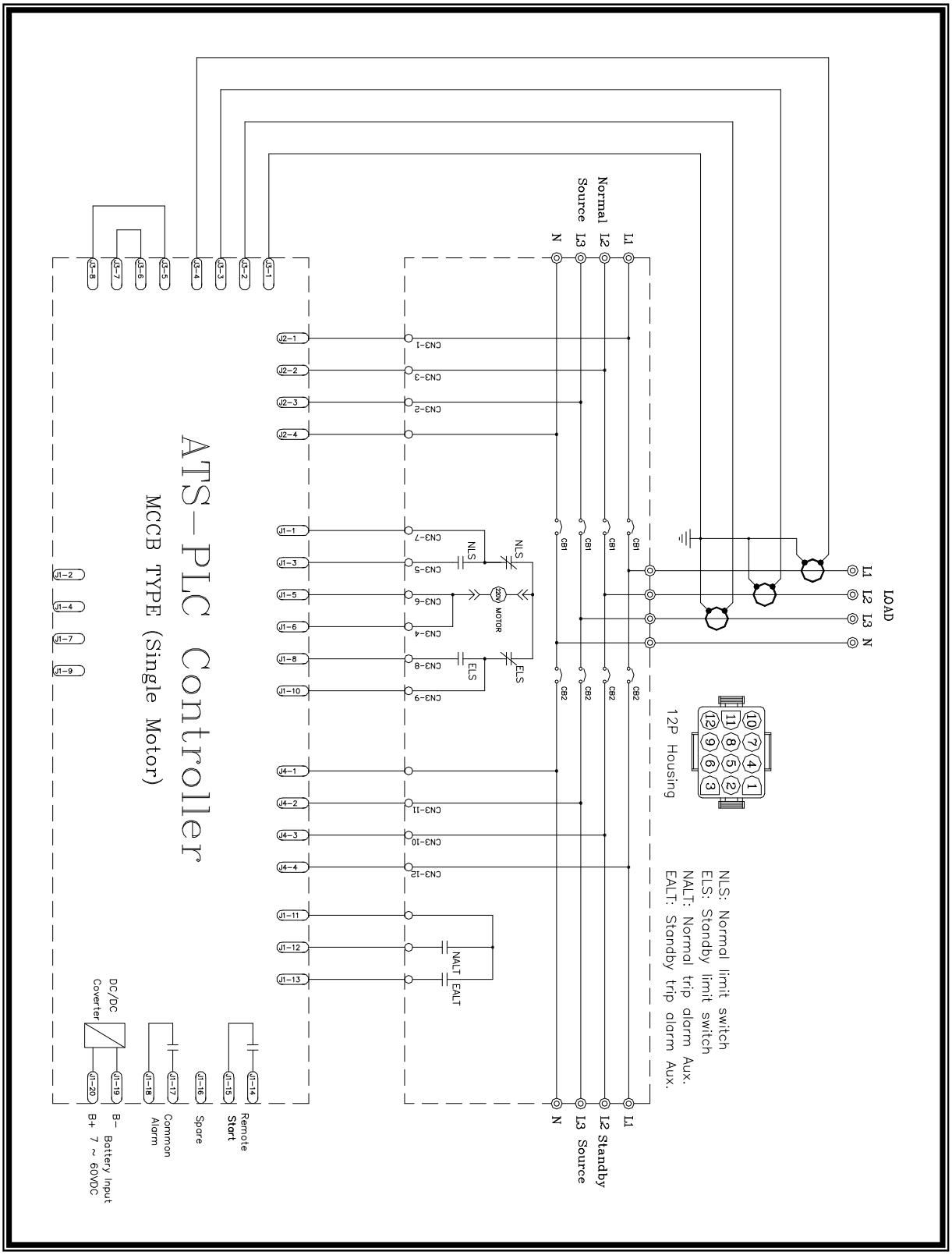
| PARAMETER | SPECIFICATION |
|---|---|
| AC Voltage Measurement Range | 50 – 530 Vac 50/60 Hz |
| Frequency Measurement Range | 40 – 75 Hz |
| Remote Start Contact | 7A @ 250 Vac Max |
| Normal ON Contact | 7A @ 250 Vac Max |
| Emergency ON Contact | 7A @ 250 Vac Max |
| Alarm Output Contact | 7A @ 250 Vac Max |
| Operating Temperature | -20 – +70 °C |
| Storage Temperature | -30 – +80 °C |
| Operating Humidity | Maximum 90% relative humidity |
| Weight | 750 g +/- 2% |

## 4.2 Unit Dimension and Installation Reference (Unit: mm)

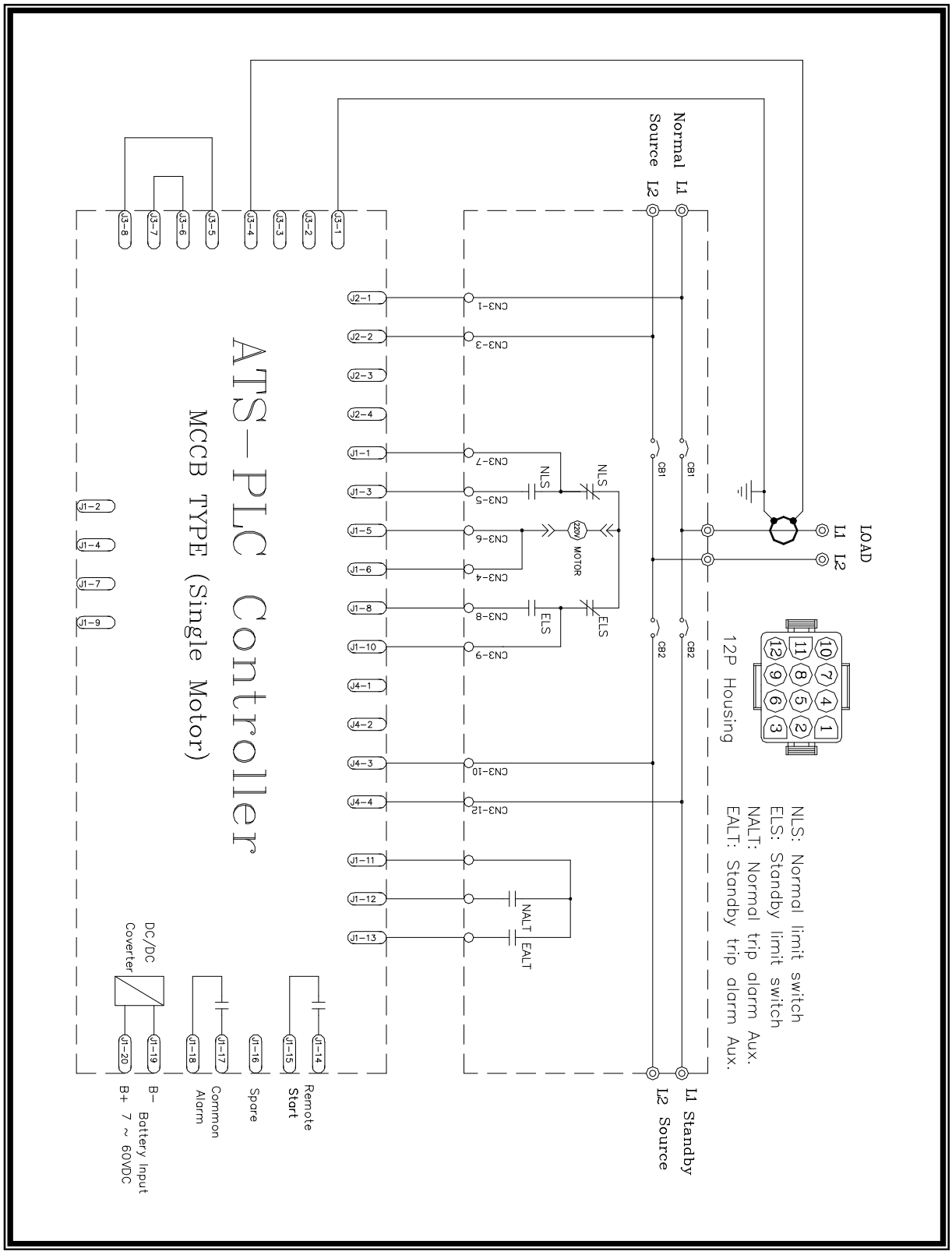


# SECTION 5 : TYPICAL WIRING

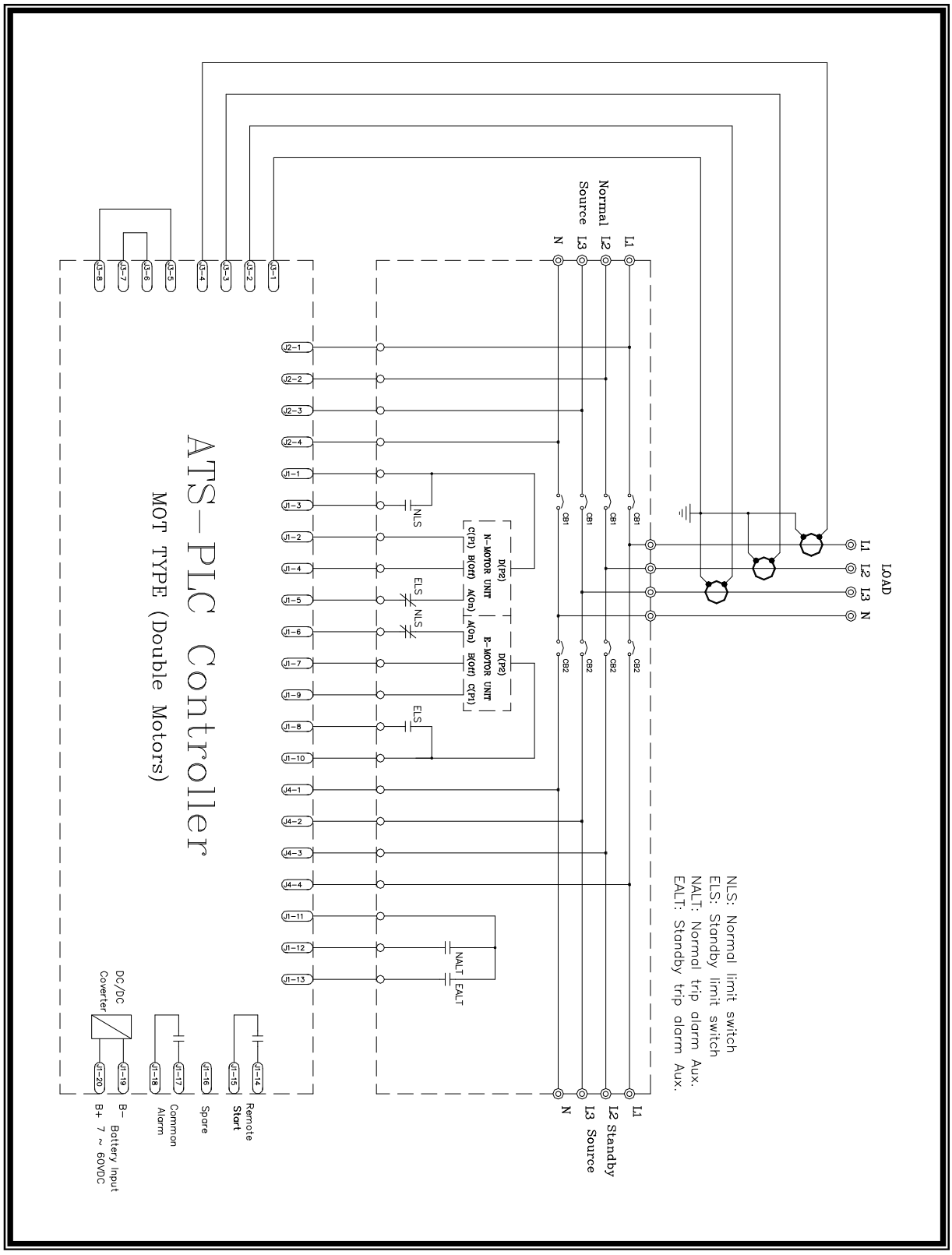
## 5.1 MCCB Type ATS Wiring Diagram (3P/4P)(220VAC) also called the BTS switch



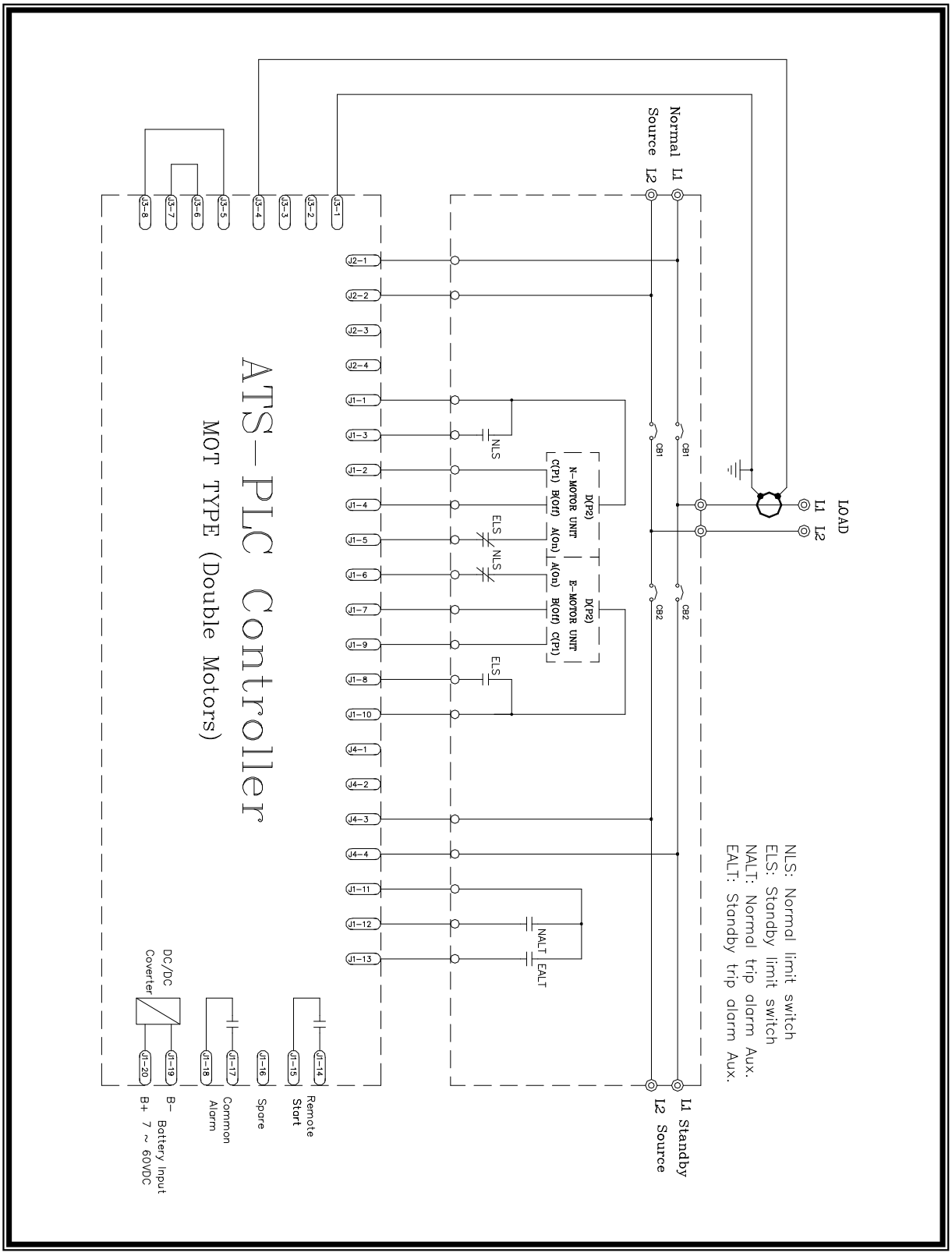
## 5.2 MCCB Type ATS Wiring Diagram (2P)(220VAC)



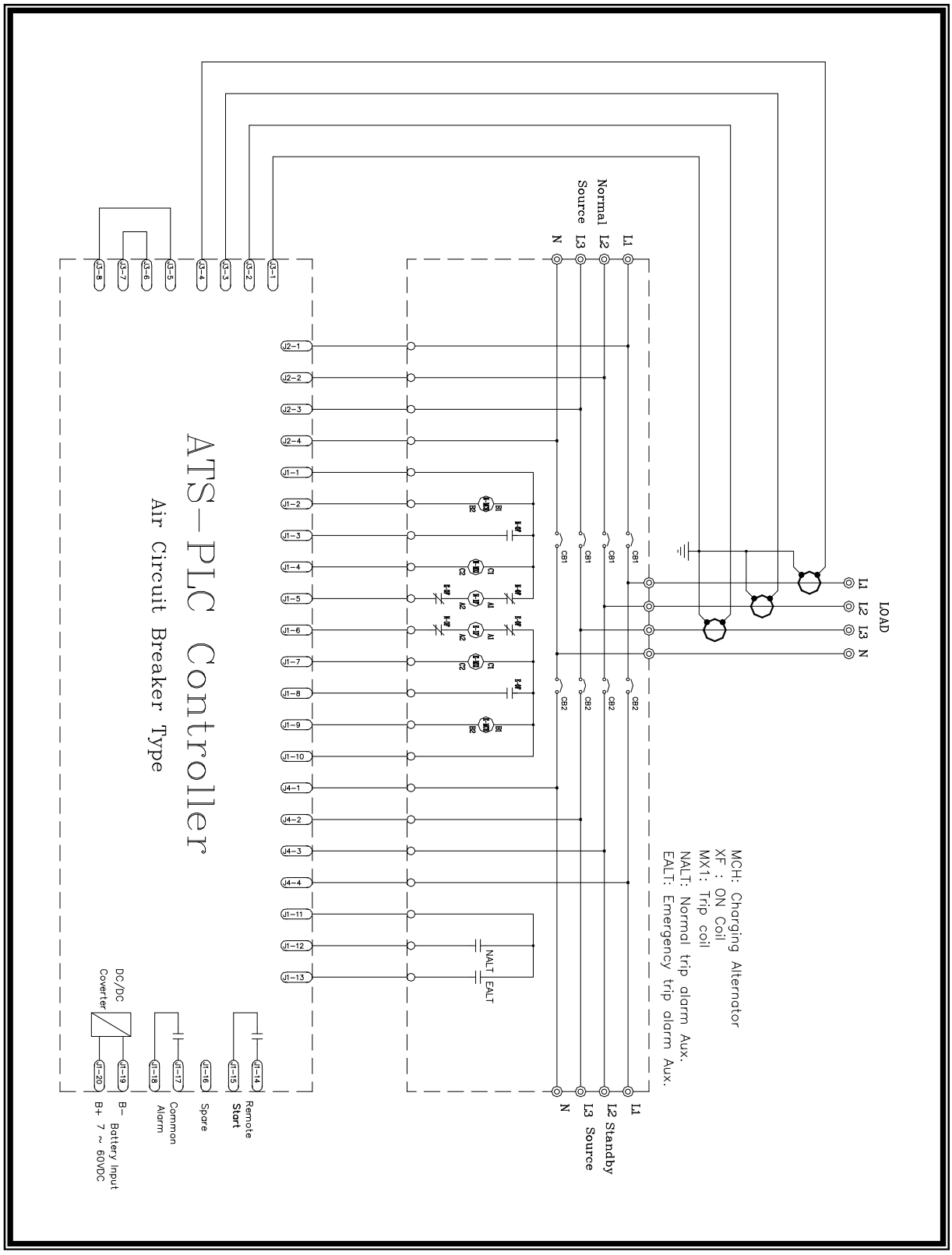
## 5.3 MOT Type ATS Wiring Diagram (3P/4P)(220VAC) Motor Operated MCCB



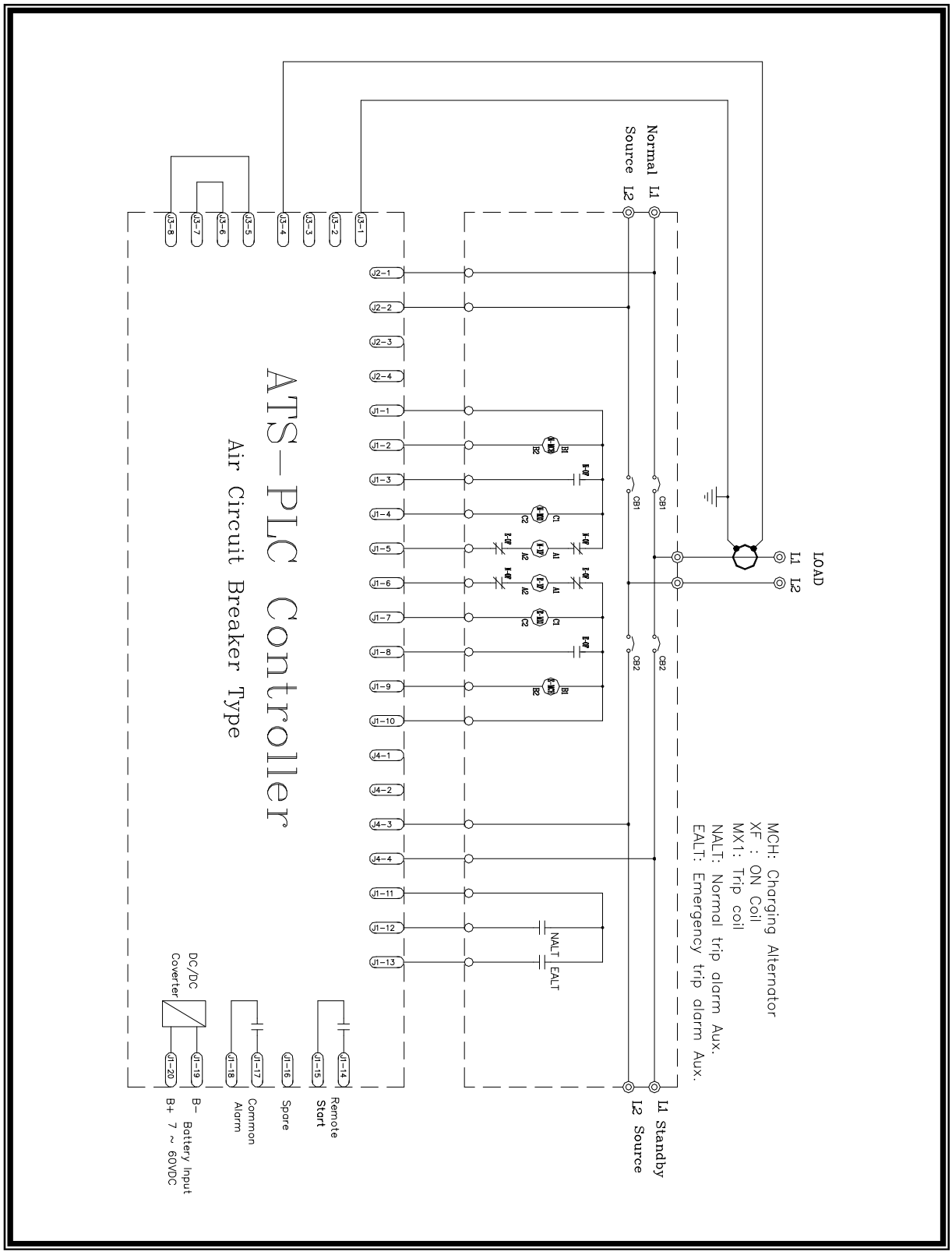
## 5.4 MOT Type ATS Wiring Diagram (2P)(220VAC)



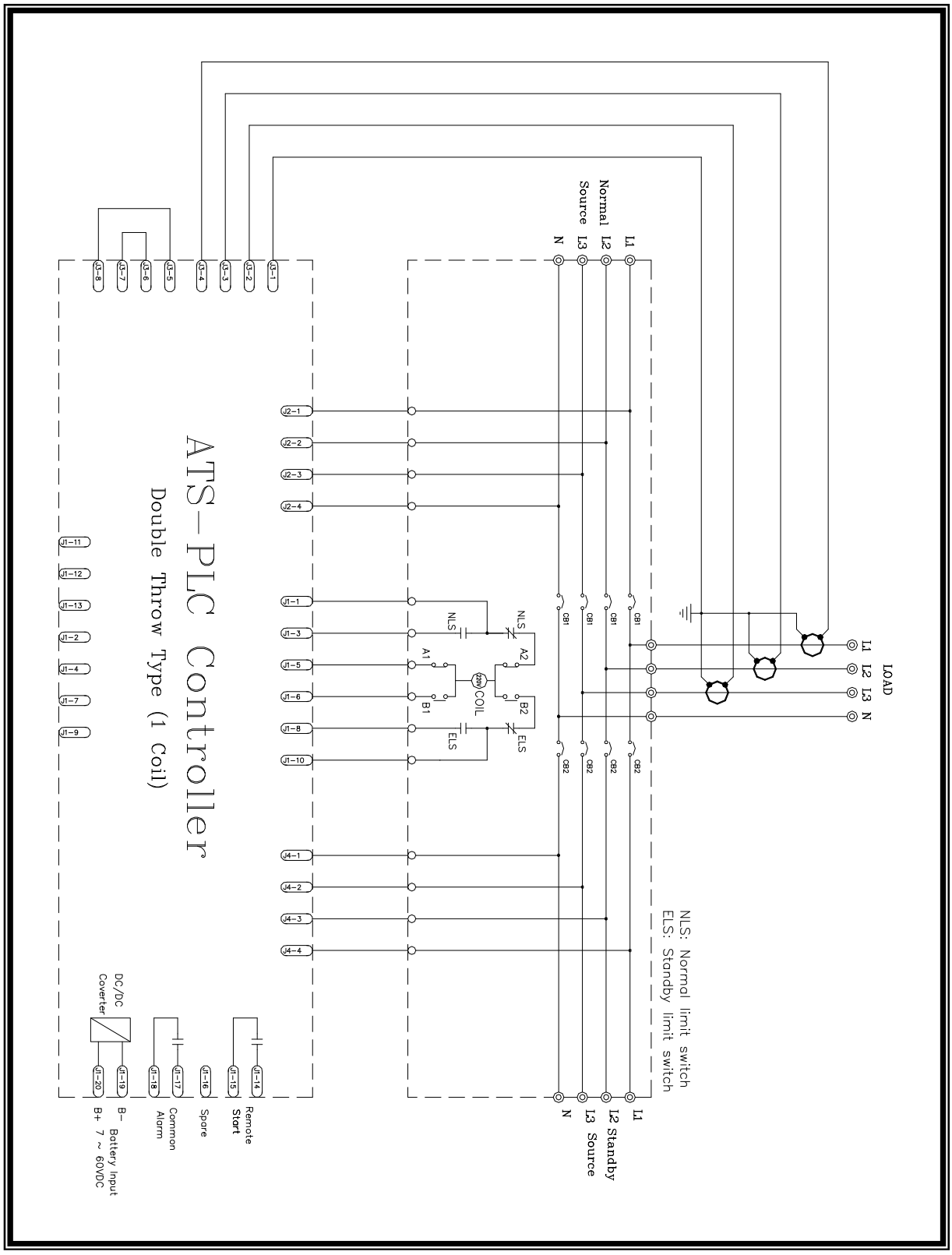
## 5.5 Air Circuit Breaker Type ATS Wiring Diagram (3P/4P)(220VAC)



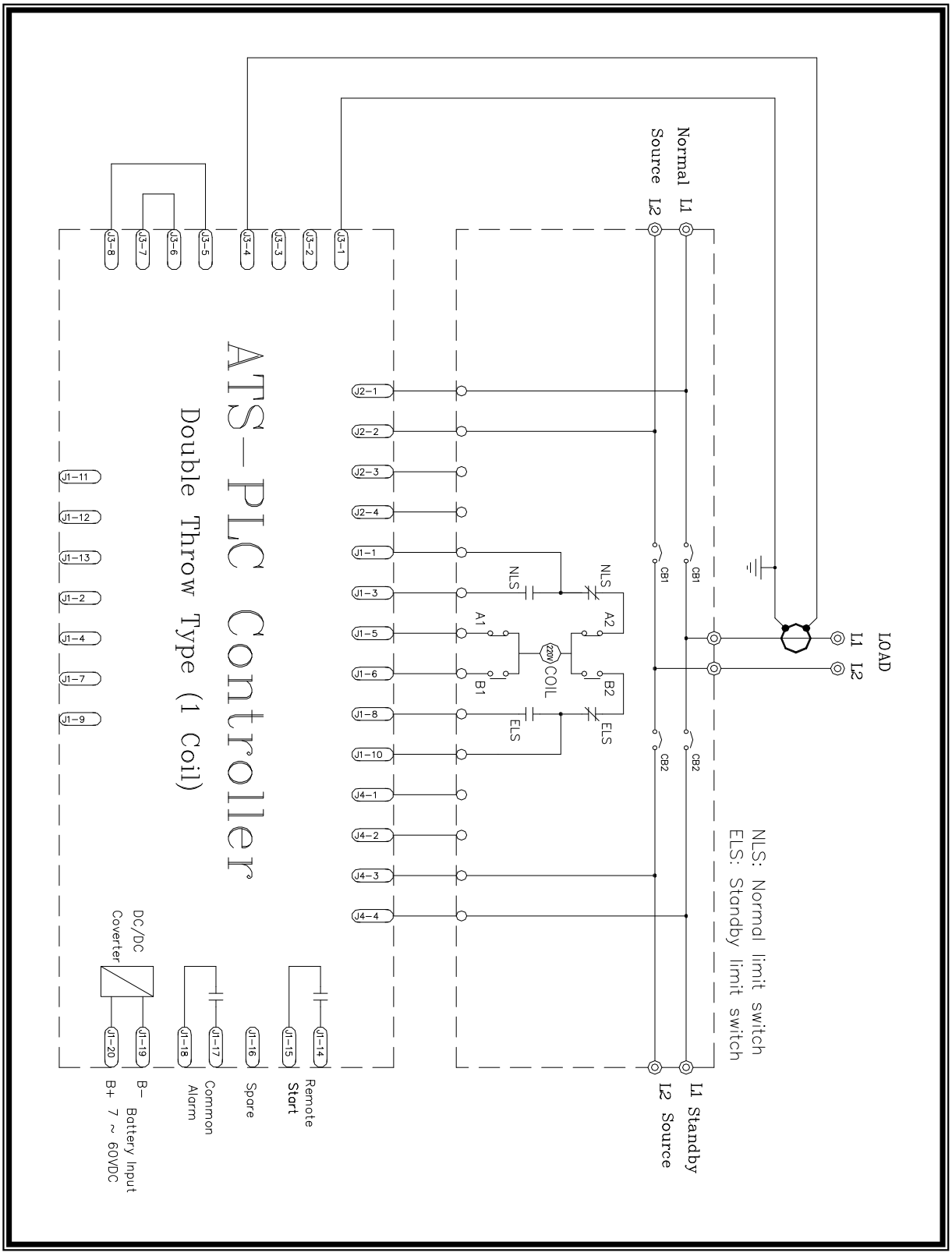
## 5.6 Air Circuit Breaker Type ATS Wiring Diagram (2P)(220VAC)



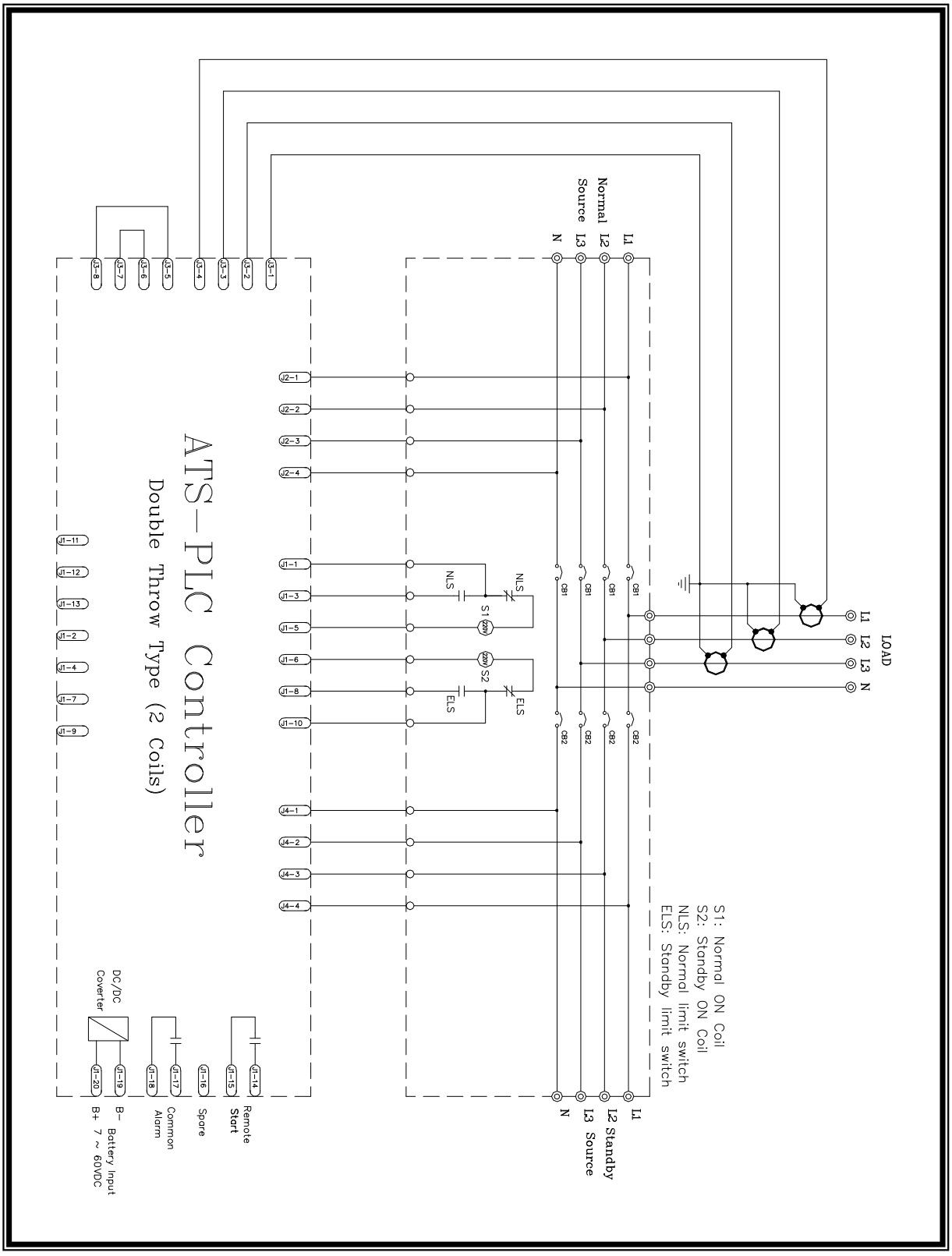
## 5.7 Single Coil Double Throw Type ATS Wiring Diagram (3P/4P)(220VAC)



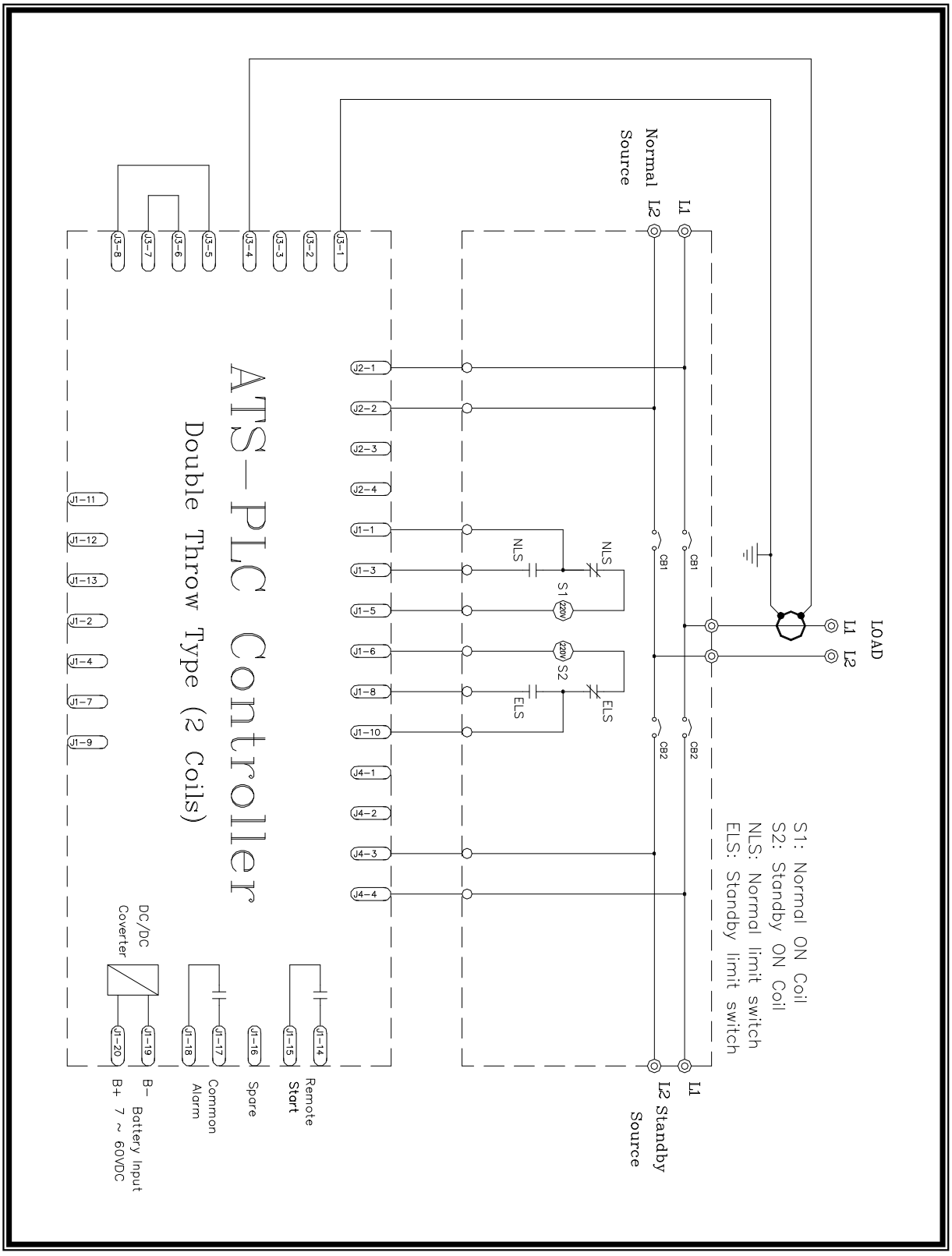
## 5.8 Single Coil Double Throw Type ATS Wiring Diagram (2P)(220VAC)



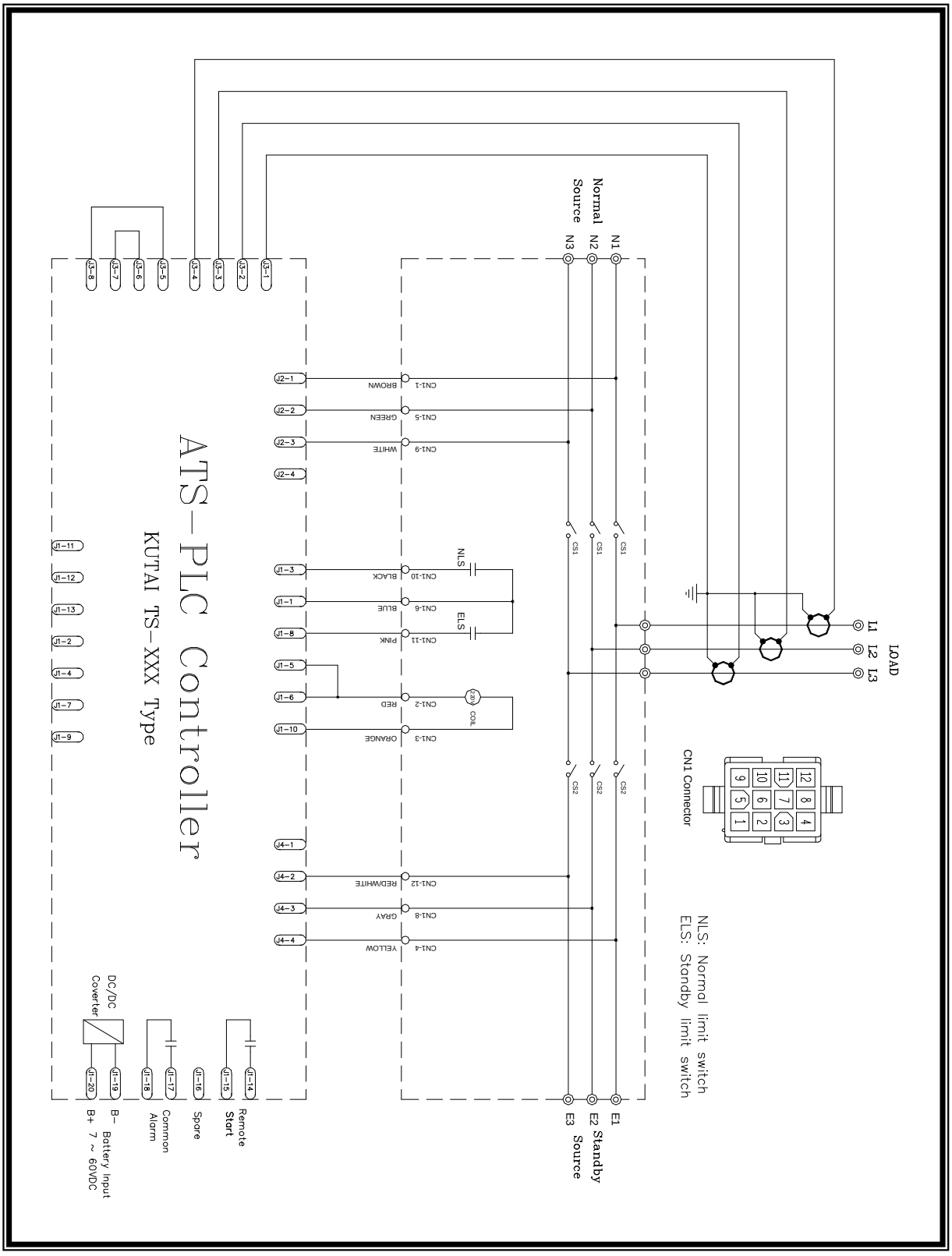
## 5.9 Dual Coil Double Throw Type ATS Wiring Diagram (3P/4P)(220VAC)



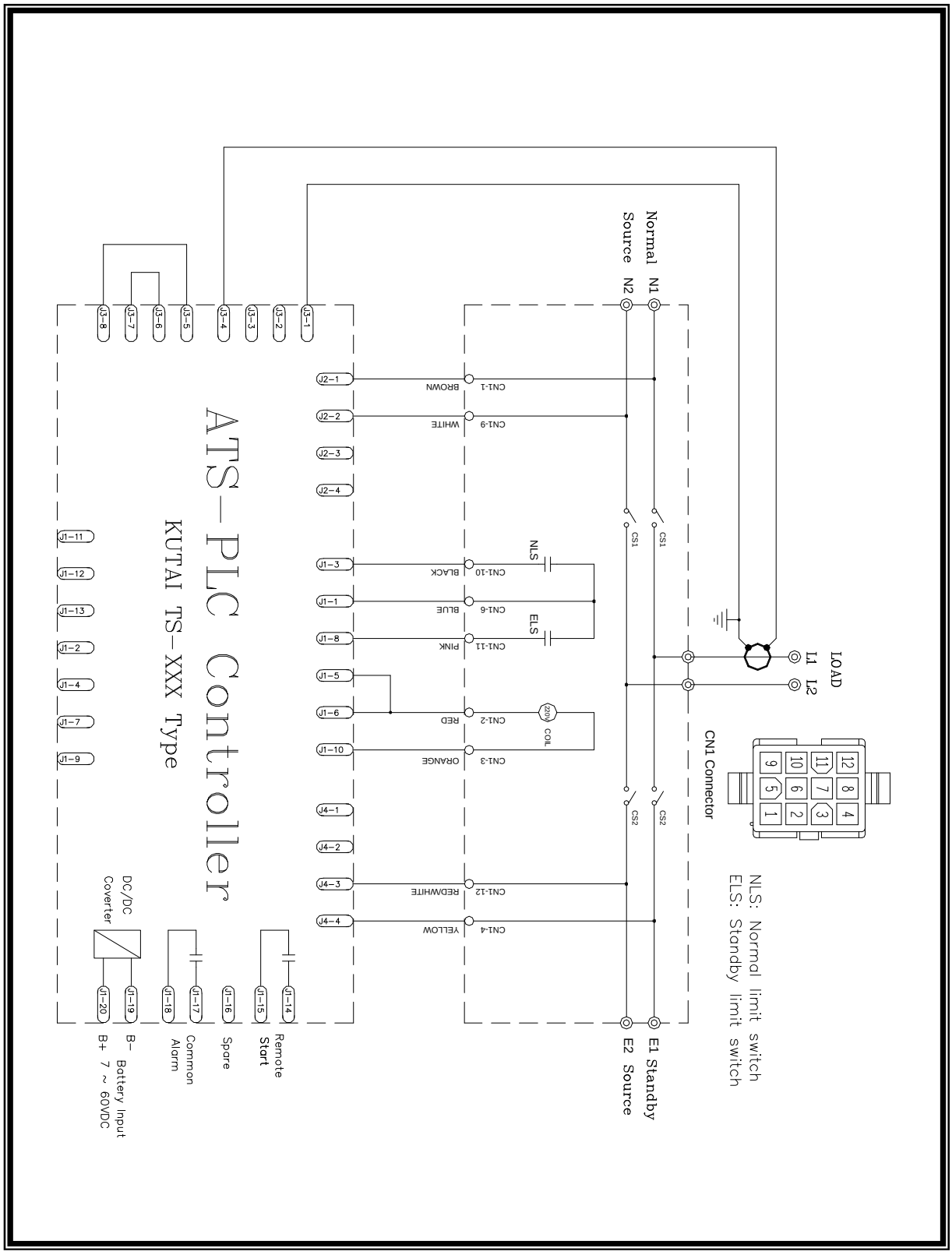
## 5.10 Dual Coil Double Throw Type ATS Wiring Diagram (2P)(220VAC)



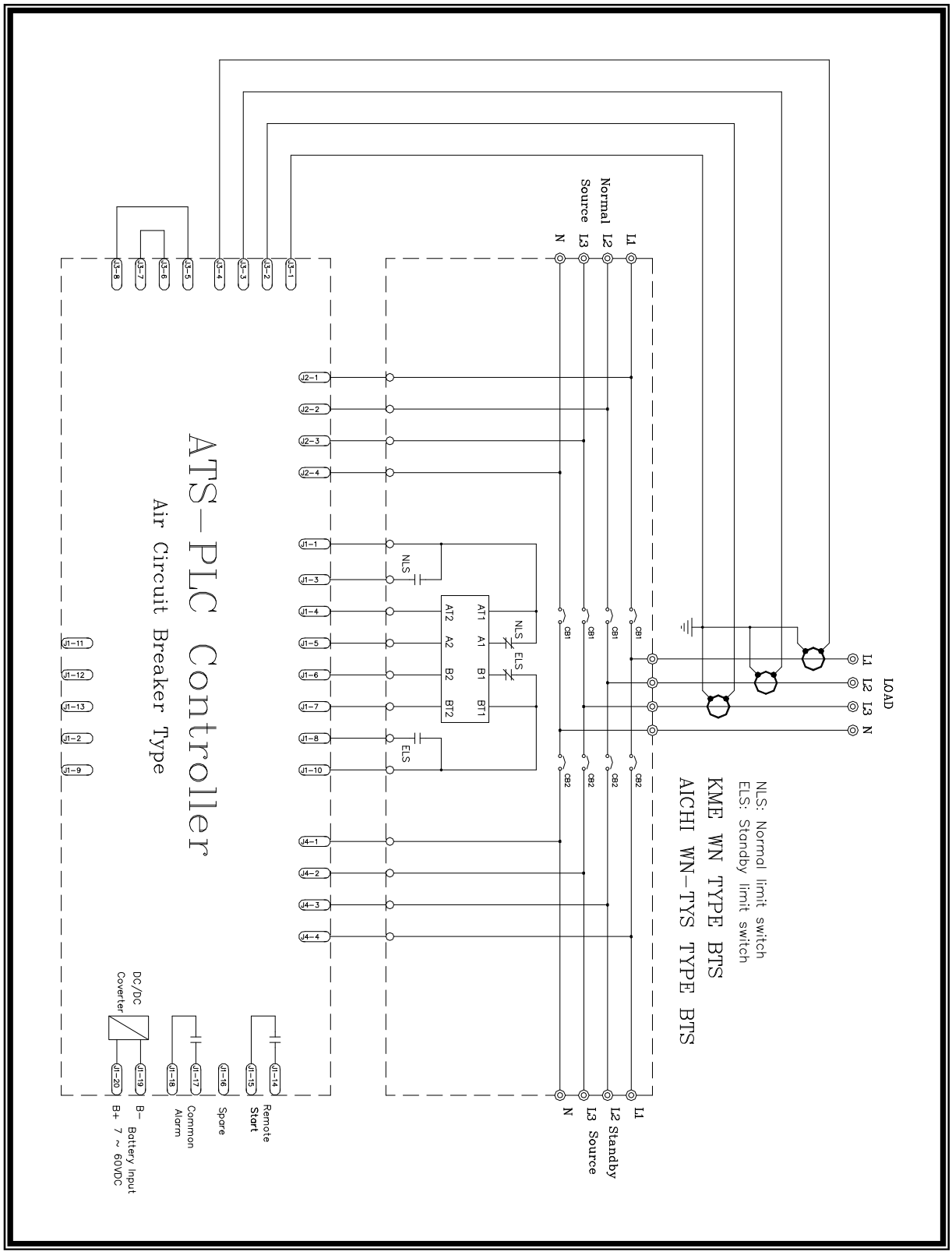
## 5.11 KUTAI TS-XXX Type ATS Wiring Diagram (3P/4P)(220VAC)



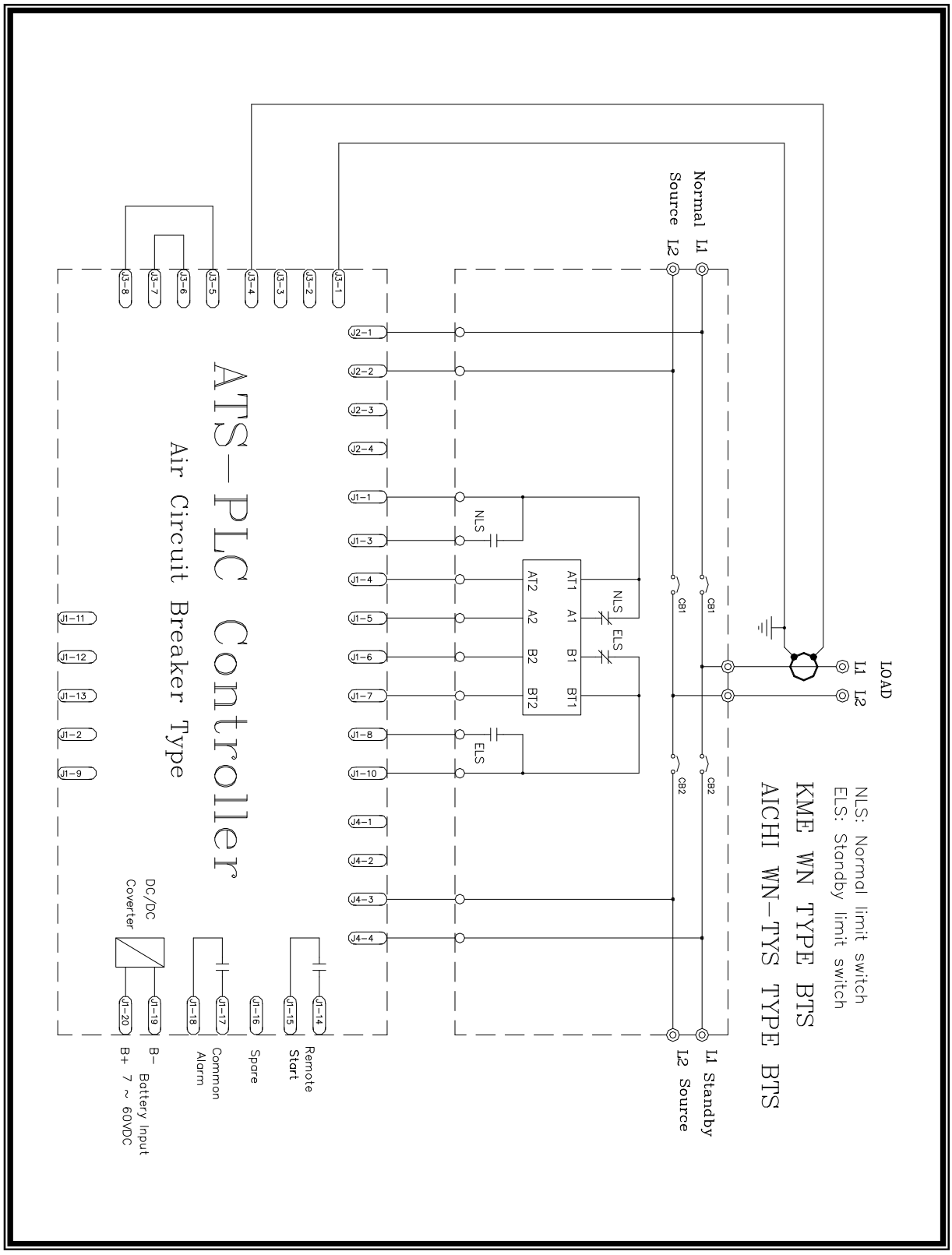
## 5.12 KUTAI TS-XXX Type ATS Wiring Diagram (2P)(220VAC)



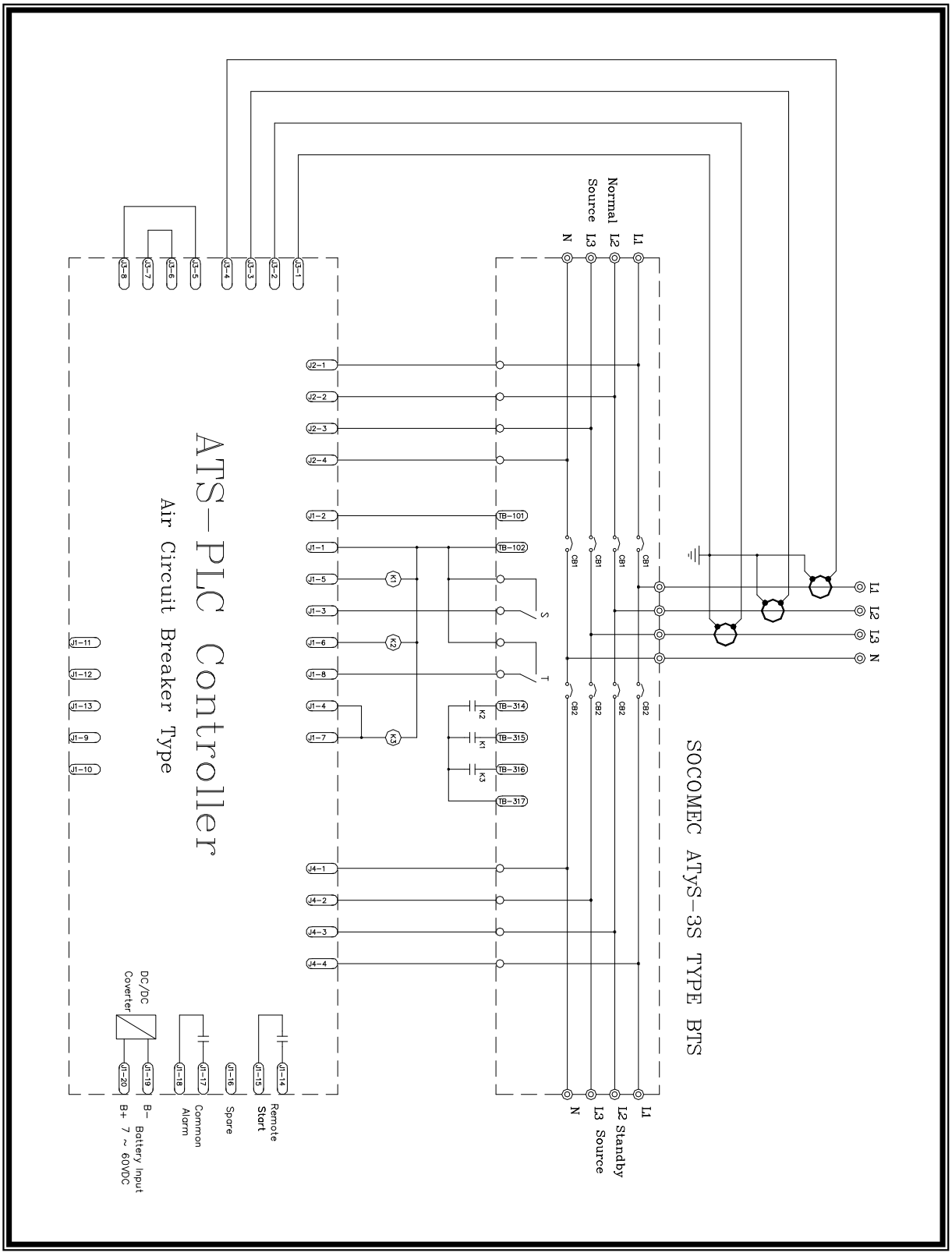
## 5.13 KME WN Type and AICHI WN type ATS Wiring Diagram (3P/4P)(220VAC)



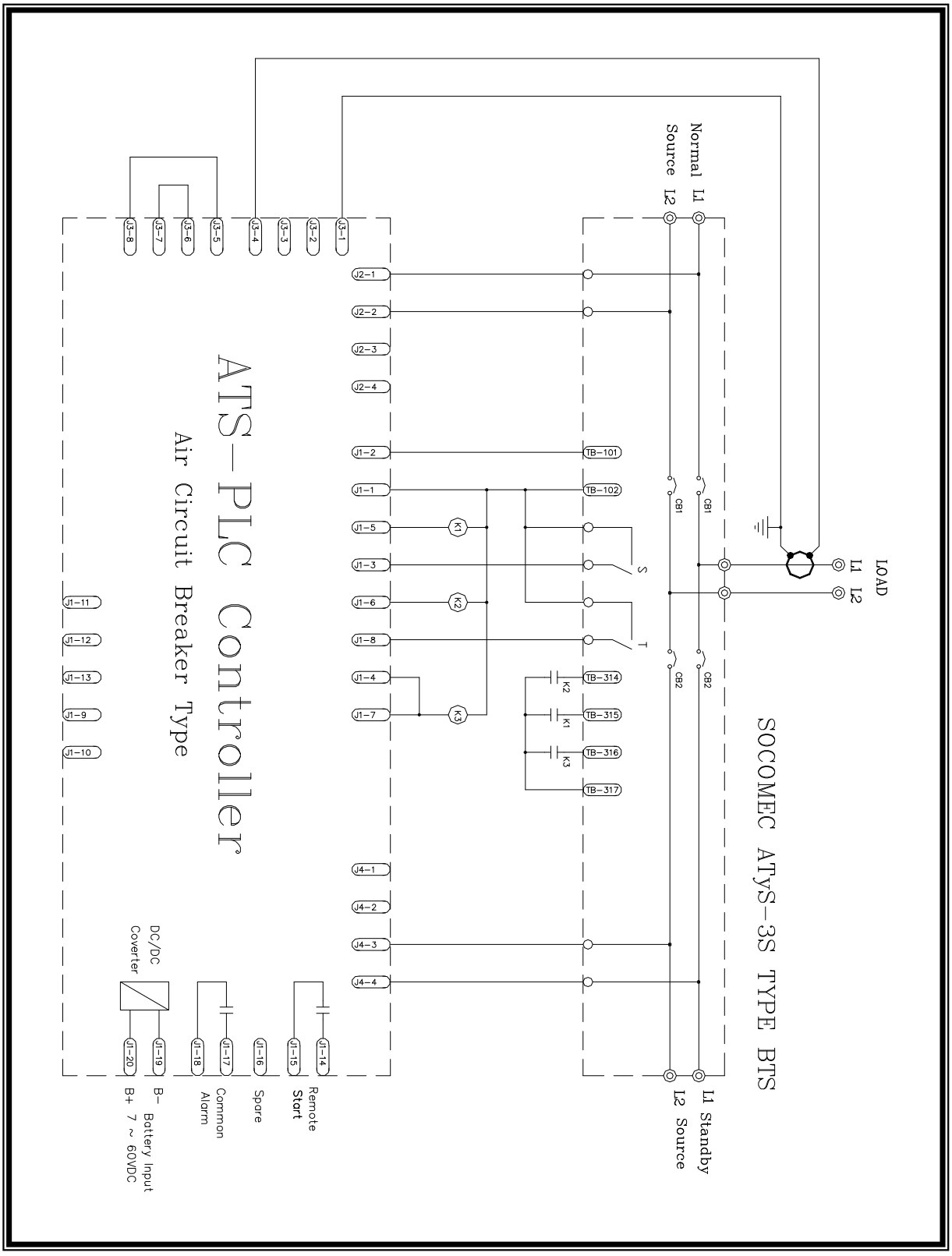
## 5.14 KME WN Type and AICHI WN type ATS Wiring Diagram (2P)(220VAC)



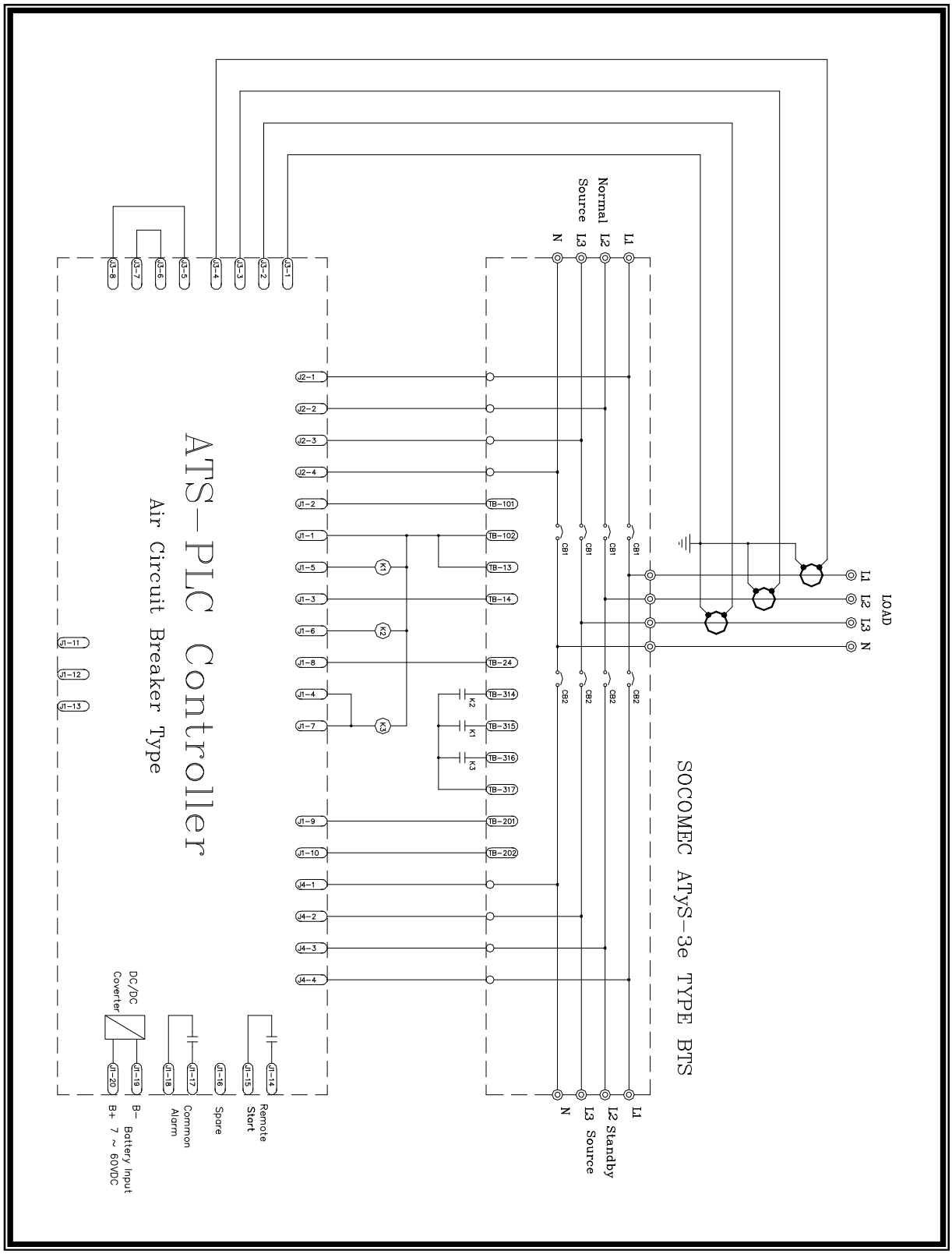
## 5.15 SOCOMEC ATyS-3S type ATS Wiring Diagram (3P/4P)(220VAC)



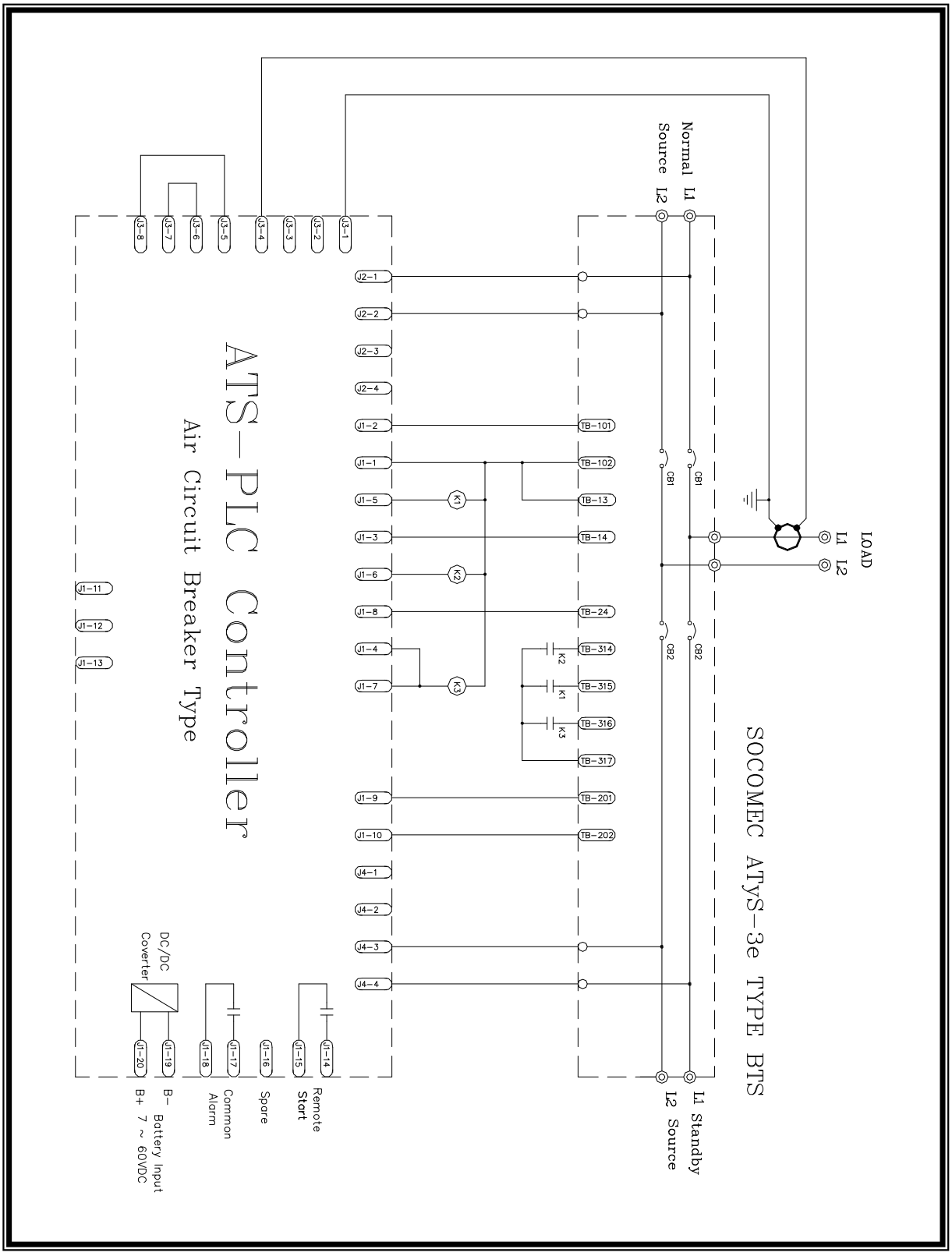
## 5.16 SOCOMEC ATyS-3S type ATS Wiring Diagram (2P)(220VAC)



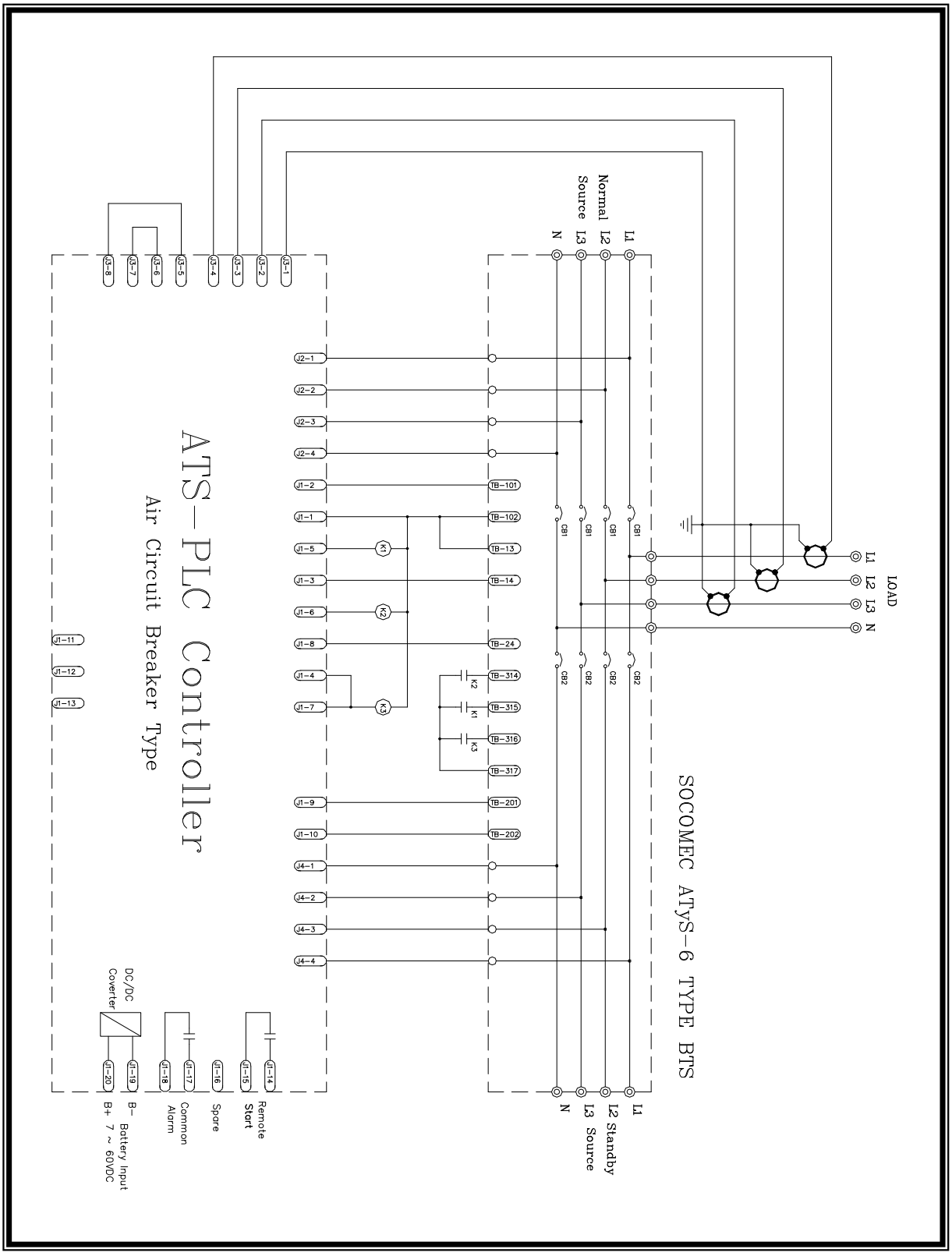
## 5.17 SOCOMEC ATyS-3e type ATS Wiring Diagram (3P/4P)(220VAC)



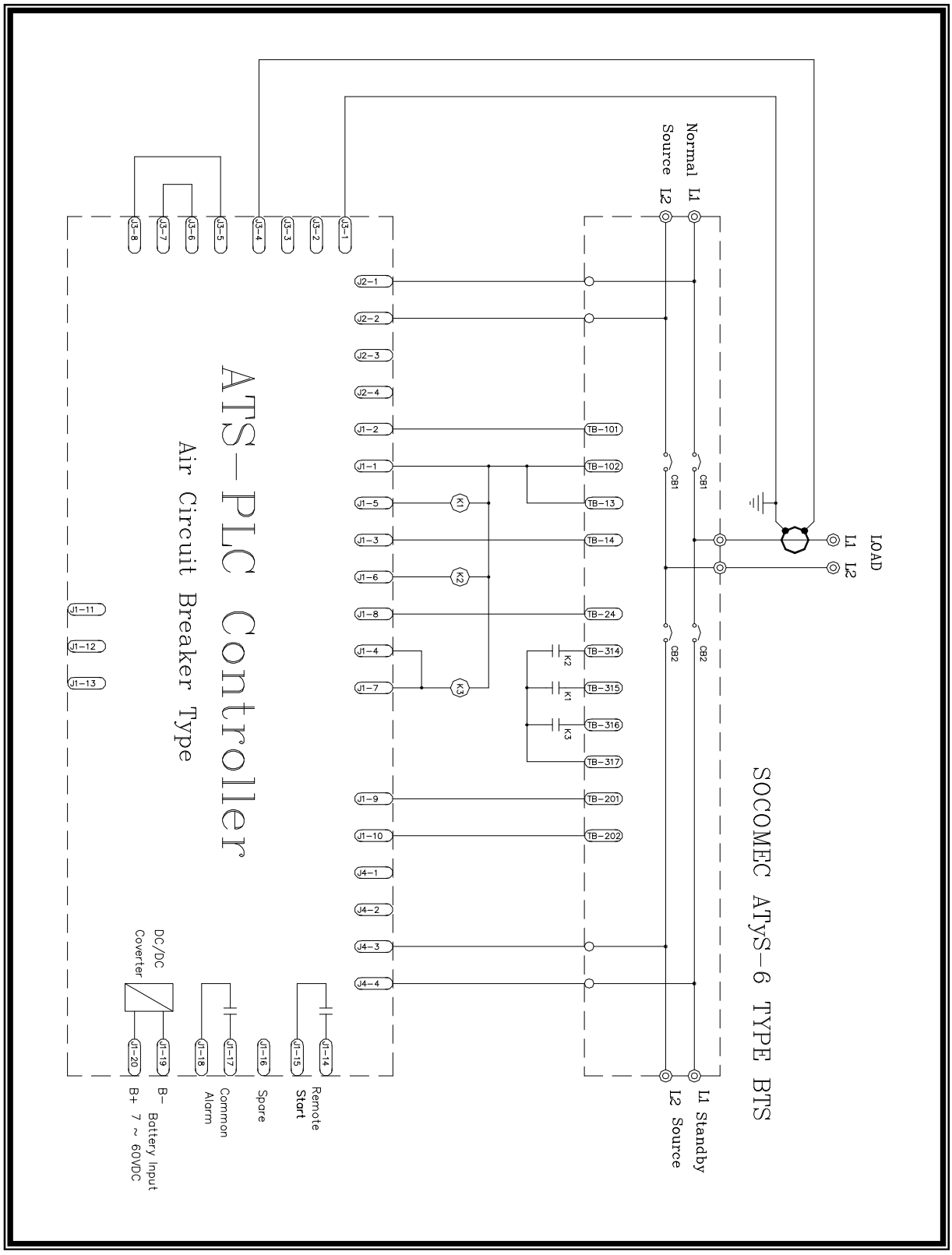
## 5.18 SOCOMEC ATyS-3e type ATS Wiring Diagram (2P)(220VAC)



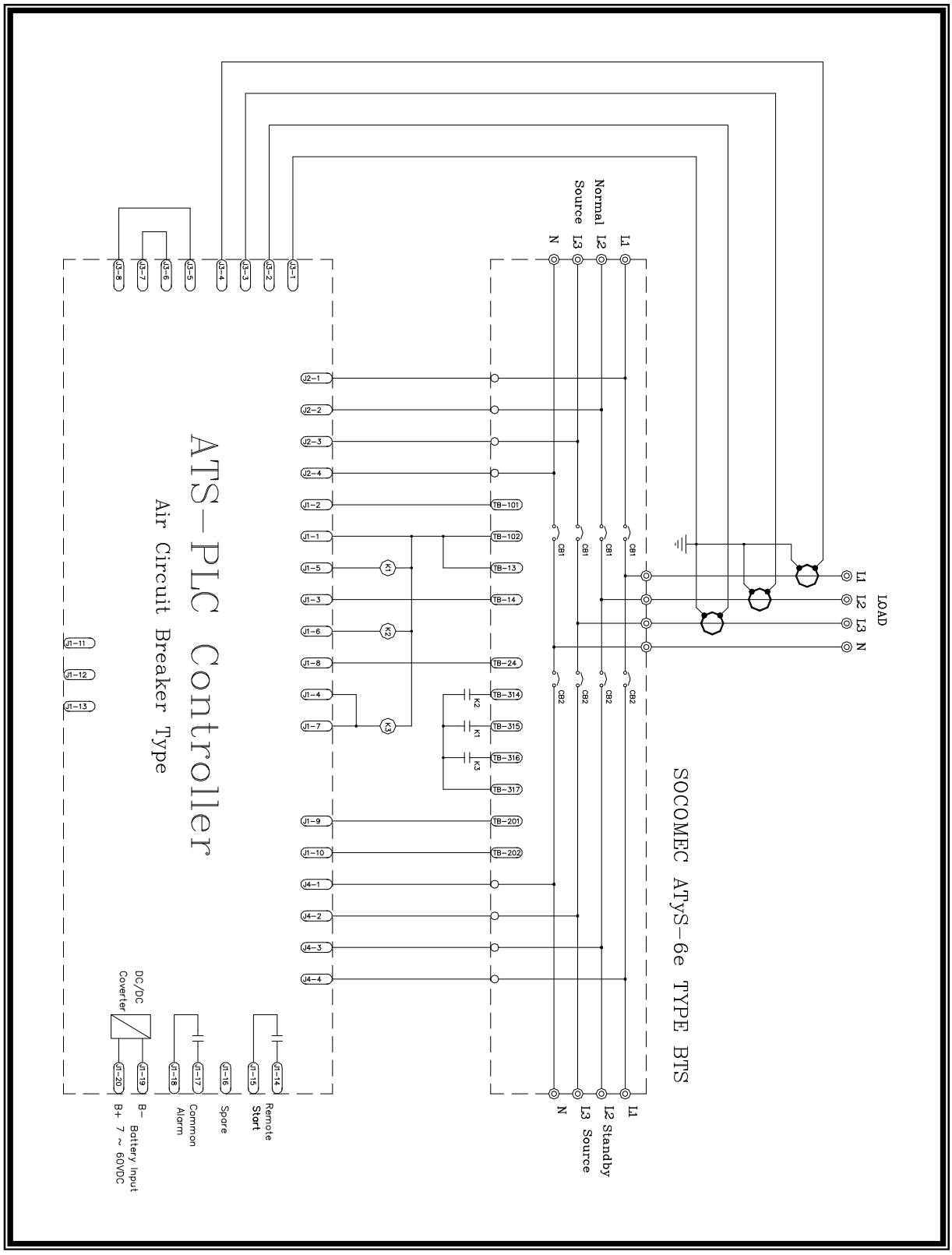
## 5.19 SOCOMEC ATyS-6 type ATS Wiring Diagram (3P/4P)(220VAC)



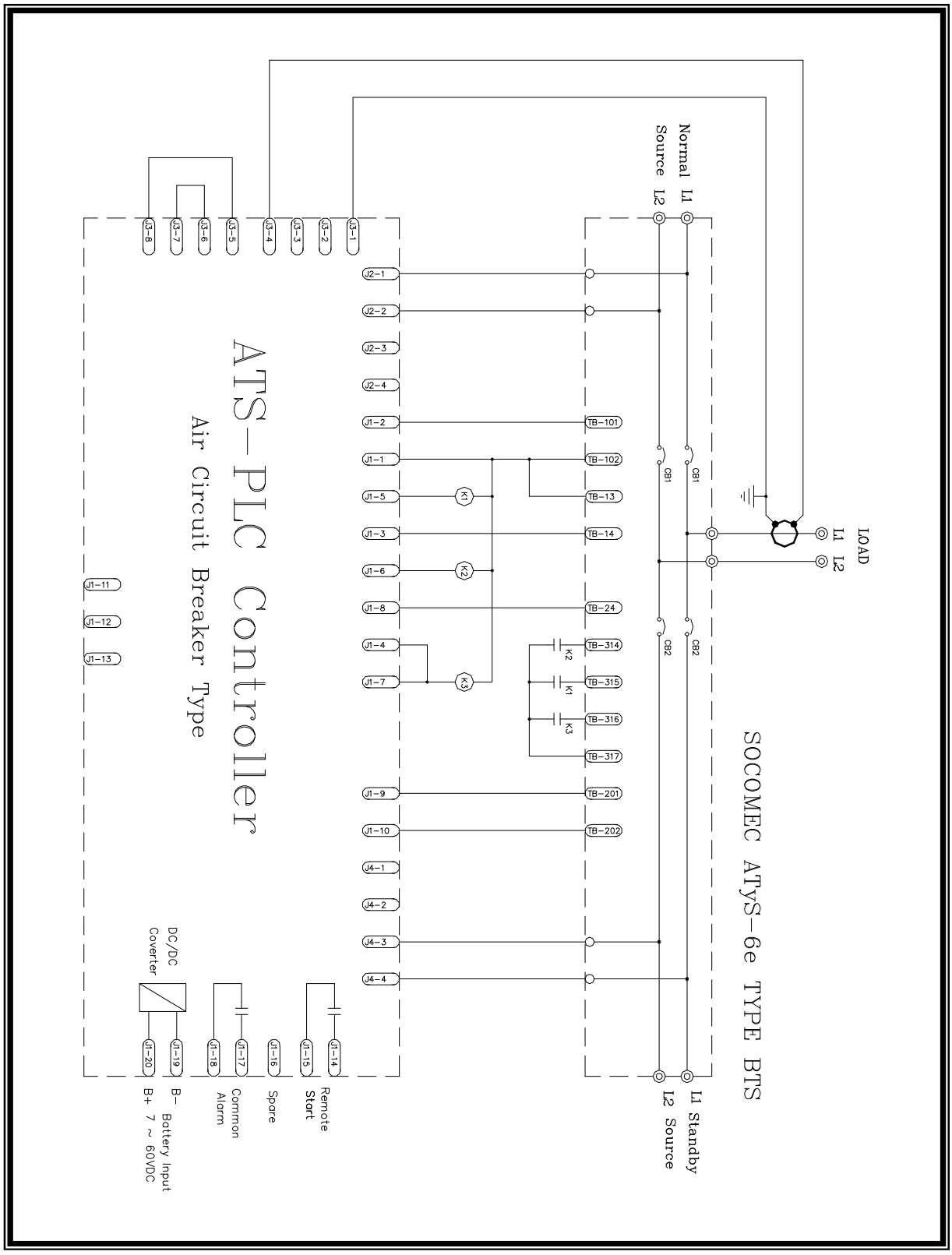
## 5.20 SOCOMEC ATyS-6 type ATS Wiring Diagram (2P)(220VAC)



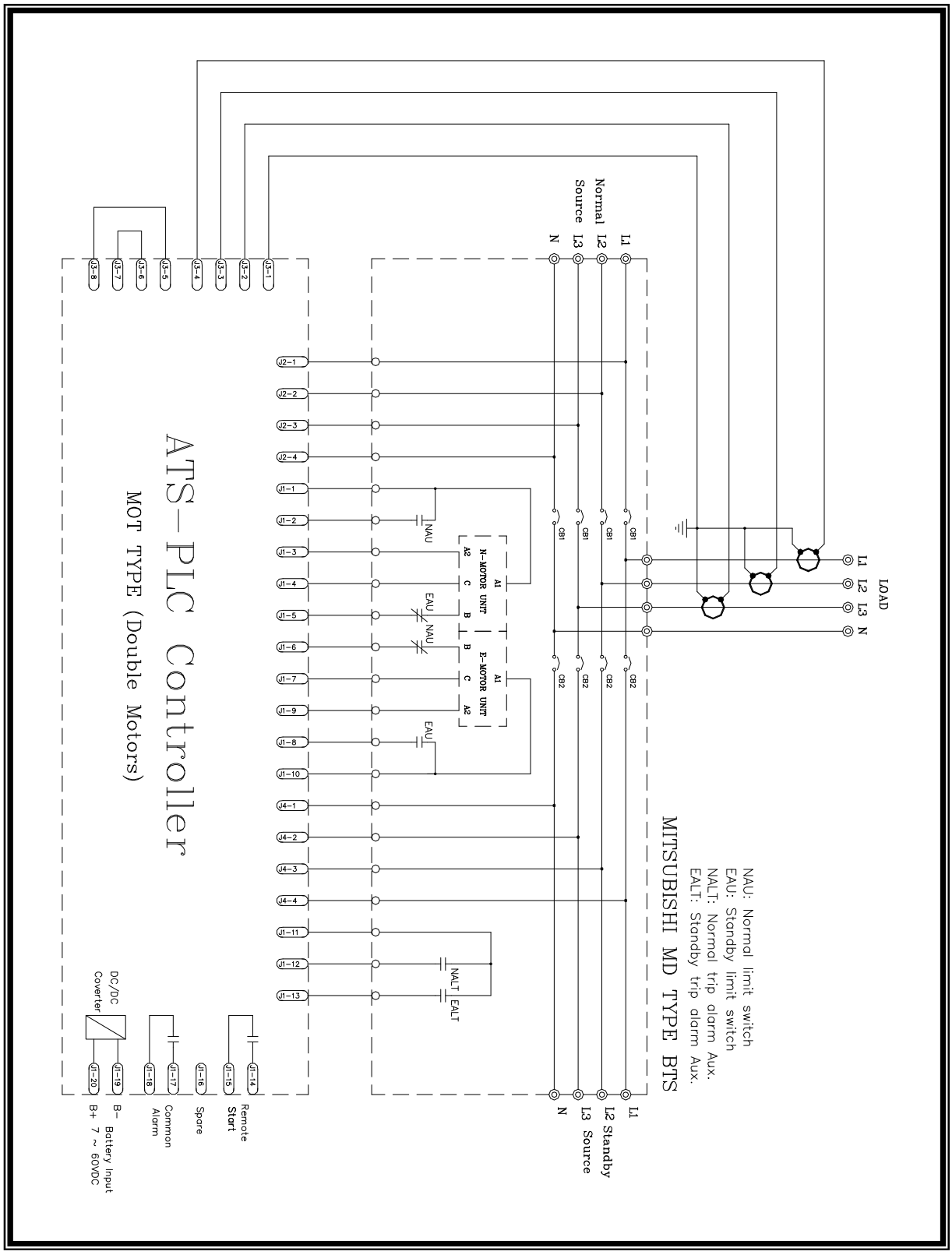
## 5.21 SOCOMEC ATyS-6e type ATS Wiring Diagram (3P/4P)(220VAC)



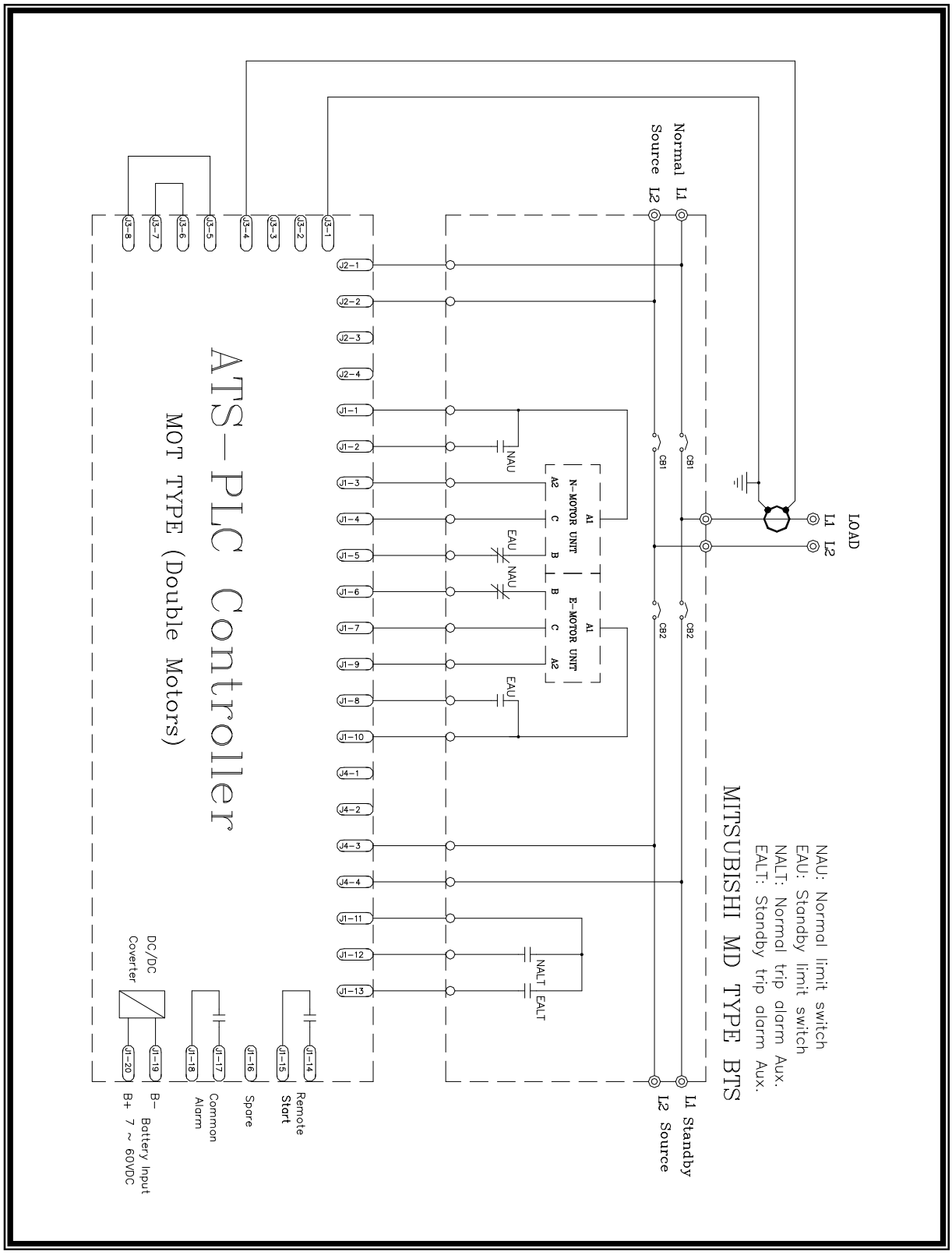
## 5.22 SOCOMEC ATyS-6e type ATS Wiring Diagram (2P)(220VAC)



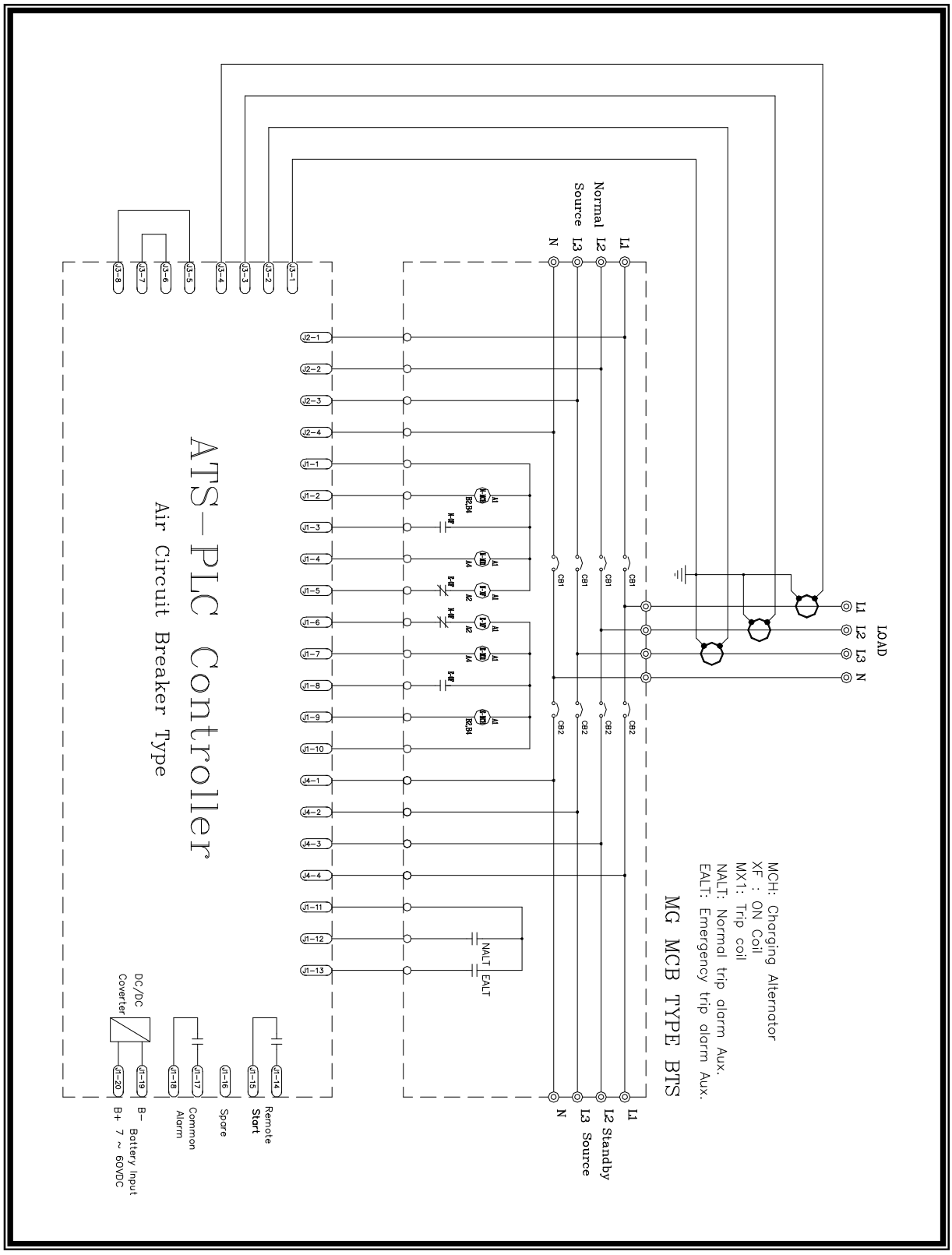
## 5.23 MITSUBISHI MD type ATS Wiring Diagram (3P/4P)(220VAC)



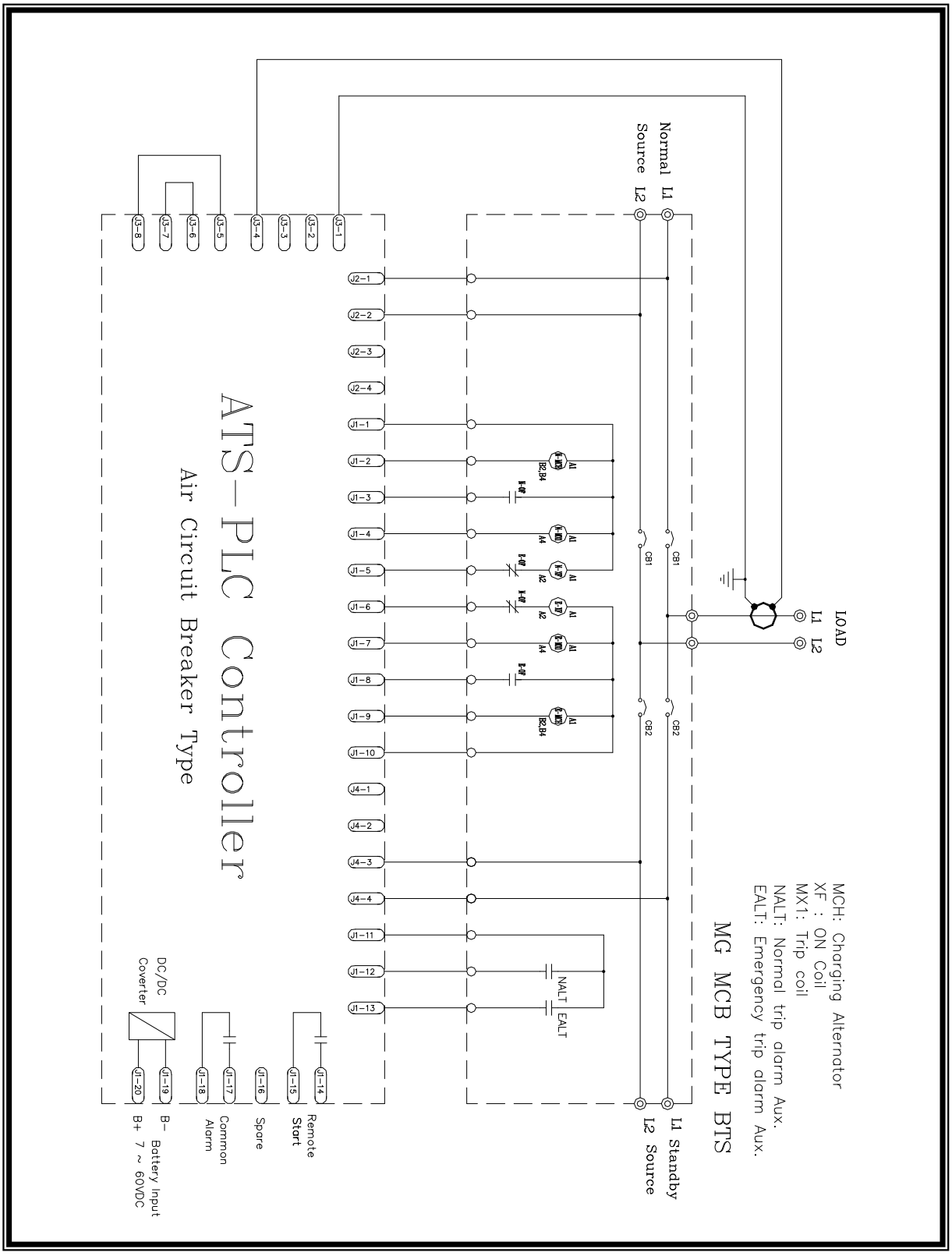
## 5.24 MITSUBISHI MD type ATS Wiring Diagram (2P)(220VAC)



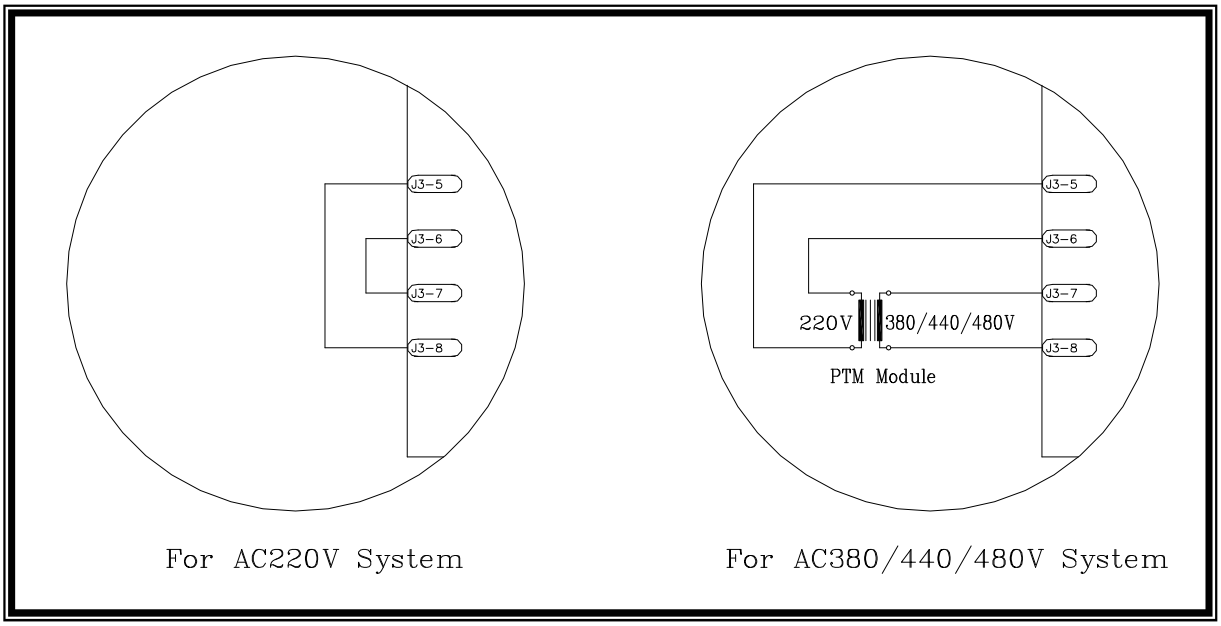
## 5.25 MERLIN GERIN MCB type ATS Wiring Diagram (3P/4P)(220VAC)



## 5.26 MERLIN GERIN MCB type ATS Wiring Diagram (2P)(220VAC)



## 5.27 System Voltage different From AC220V wiring Diagram



## APPENDIX 01: Touch Screen Sensitivity Calibration

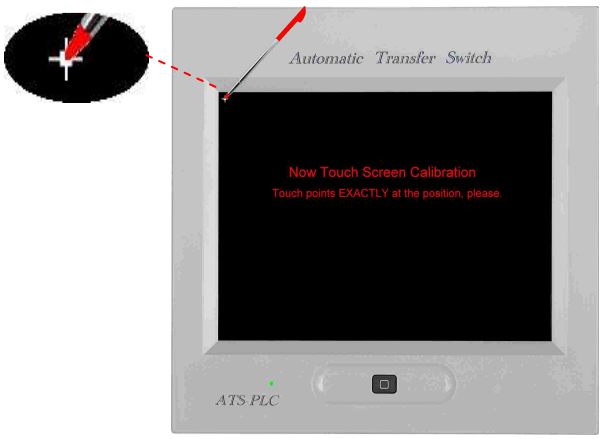
* The accuracy and sensitivity is precisely adjusted in factory, unless necessary, please do not recalibrate.

Attention! Never use sharp and pointy objects when calibrating touch screen. Use standard touch panel stylus only to prevent damage to the screen.

Step 1 : Power on controller.

Step 2 : Press and hold “Home” key for 10secs to enter the calibration (As shown in the below illustration).

Step 3 : first coordinate will first appear in the upper left-hand corner, aim for the center of the coordinate and press. Total of 7 coordinates needs to be calibrated



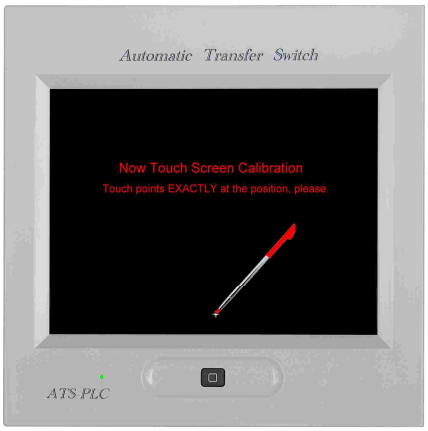

Step 4 : 2nd coordinate.

Step 5 : 3rd coordinate.

Step 6 : 4th coordinate.

Step 7 : 5th coordinate.

Step 8 : 6th coordinate.




Step 9 : 7th coordinate (last calibration).

Step 10 : After all 7 coordinates are successfully calibrated, the screen will display “Saving Calibration Parameters” to end the sensitivity calibration.

Attention! Once sensitivity calibration begins, all coordinate must be calibrated, before system is able to return to normal operation. If accidentally touched the screen or inaccurate adjustment is made during calibration, please completed the rest of calibration first before resuming to step 1 and recalibrate.

## APPENDIX 02: Download Start-up Screen

When powering up the ATS-PLC, the system will display a customizable start-up screen. This chapter will provide you with the step by step instruction on how to setup customizing start-up screen.

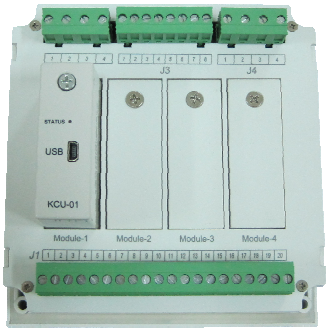
Note 1 : The Start-up Screen picture format is limited to bmp, jpg and png files only with image size 630*390. The system will proportionally reduce the image size if image size exceeds the limit.

Note 2 : To download the image from PC to ATS-PLC, user will need to connect a KCU-01 USB communication module (optional) to the controller.

KCU-01 USB Module

Step 1 : Before connecting the ATS-PLC to the PC, user must first install the “KCU-01 Modules” and “ATS-PLC Image Transfer Software” software to the PC. Drivers are supplied in the supplied software disk or can be downloaded from Kutai Electronics website www.kutai.com.tw.

Step 2 : Remove all other communication module(s) leaving only KCU-01 module installed.

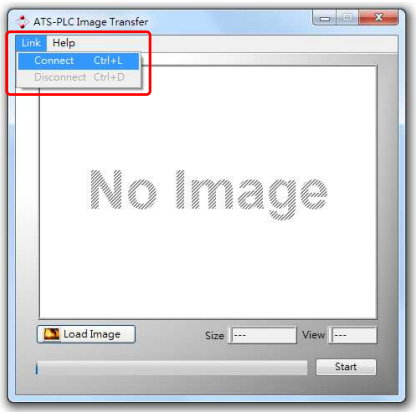



Step 3 : Turn on the DC power.

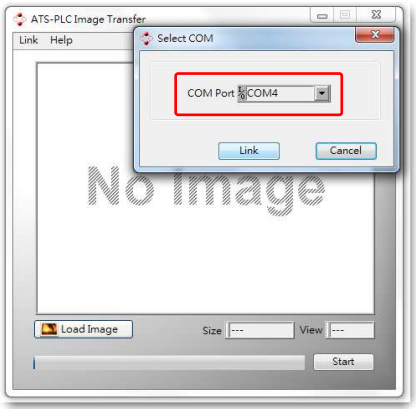
Step 4 : Connect the USB cable to the KCU-01 and PC.

Step 5 : Execute the “ATS-PLC Image Transfer Software”.

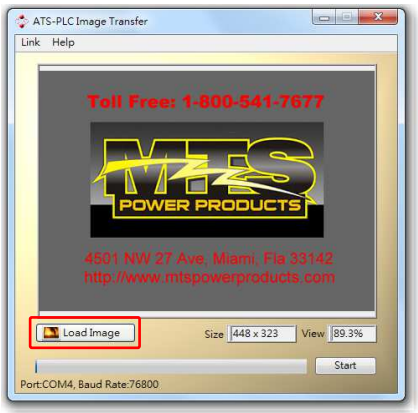
Step 6 : Click on “Link” and select “Connect” to connect to the KCU-01 module




Step 7 : Select the correct COM Port.




Step 8 : Click “Load Image” and select the image wishes to upload.



Step 9 : Enter Communication Setup and click on “ATS-PLC Communication Interface”.

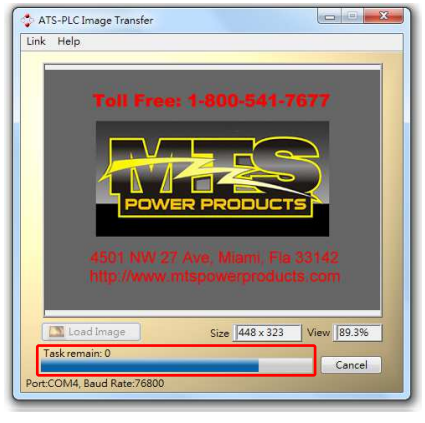
Step 10 : Disable ATS-PLC communication function.

Step 11 : Return to Communication Setup and click “Download Image”.

Step 12 : The controller will display the follow screen.

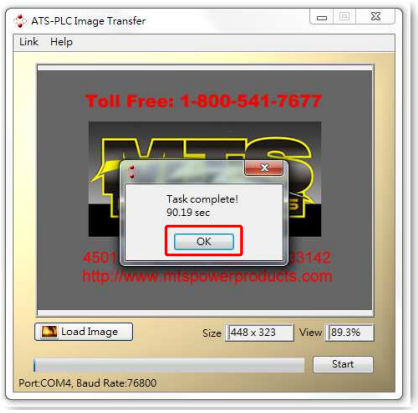
Step 13 : Click on “Start” on PC screen to begin file download.

Step 14 : File downloading.



Step 15 : Downloading completed.

Step 16 : Click on “OK” to end the downloading sequence.




Step 17 : Click on “Link” and select “Disconnect” and remove the USB connection.

Attention! After image is downloaded (Step 15), if user wishes to change to other image, or download image to another controller, please remove USB connection from PC and re-plug it again and retrace back to Step 2.